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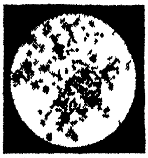

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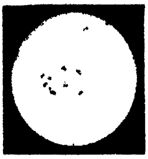

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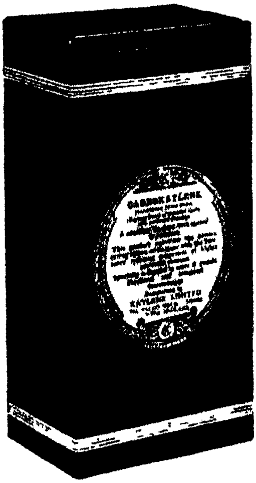

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THE PRACTITIONER

No. 784 OCTOBER 1933 Vol. CXXXI

THE PRESENT DAY THERAPY OF NERVOUS DISORDERS IN GENERAL PRACTICE

BY EDWIN BRAMWELL, M.D., F.R.C.P.

Moncrieff-Arnott Professor of Clinical Medicine in the University of Edinburgh.

INTRODUCTION

THE efficiency of Medicine as a profession is to be gauged by the competence of the general practitioners, and not by the scientific reputation of the specialists, of the country. It is the general practitioner who meets with, and has to treat, disease in its earliest stages. He knows his patients and their circumstances and he is, or should be, an expert on the personal side, an adept in the art of medicine. The general practitioner must remain the central pivot of practice if the present high standard, on which we pride ourselves, is to be maintained. A tendency for the patient to consult directly the specialist of his choice, without in the first instance obtaining the advice of his medical attendant, is to be deprecated and discouraged in the patient's interests.

But the position of the general practitioner becomes increasingly more difficult with the progressive extension of the field of knowledge and the elaboration of the instruments of precision and the methods of the laboratory. He cannot be expected to be *au fait* with all the details of modern treatment in every branch of medicine. At the same time it is essential, if he would justify his position, that he keeps himself abreast in a general way with the advances of practical importance. It is equally necessary that he should recognize his limitations and utilize the services of the specialist when these are indicated or hand the patient over to the expert for specialized treatment which his personal

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experience does not justify him in undertaking.

The general practitioner has indeed a serious responsibility. It is necessary that he should adopt a critical, though not a sceptical, attitude towards therapeutic innovations the value of which is still *sub judice.* He must remember that the worth of a therapeutic agent or method of treatment should be estimated either according to its proved efficacy or its supposed mode of action, and he must see to it that he does not lose sight of the true value of a " remedy " in his enthusiasm for attractive hypotheses and his admiration for the nicety of scientific procedures.

Conclusions as to the effects of treatment are admittedly difficult for the fallacies are numerous. If we are to make progress we must bring to bear the same critical faculties in adjudicating the results of treatment that we apply in relation to our diagnostic problems. Loose statements regarding therapeutic results call indeed for strong condemnation. Because improvement occurs while a therapeutic agent is being exhibited, it does not necessarily follow that the betterment is to be directly attributed to the remedy in question. Again we are apt to accept statements without attempting to verify them personally. There are few clinicians, for instance, who could cite personal observations which would convince the unbiassed scientific critic that muscular relaxation, electrical stimulation and massage prevent or retard muscular wasting in a case of peripheral paralysis. If we are to promote therapeutic progress we must be honest with ourselves and with our patients, we must admit the limitations of knowledge, and we must express ourselves in terms of probability or possibility when the facts do not justify dogmatic statements.

The ethics of treatment permit of differences of opinion. All, however, will probably agree that the practitioner who boasts that he is in the habit of employing the latest preparation on the market or he who uses a vaccine, a therapeutic blunderbuss or a mechanical device, when there is no indication for their use, in order to impress his patient, is no better than a charlatan. The man who, either in ignorance or in order to create the impression that he is up to date, has a variety of quite unnecessary examinations carried out or who sends his patients to see a round of specialists, when such action is quite uncalled for, is deserving of our pity or contempt.

Proof of the value of an affirmed remedy is to be based on bedside observation. Here the general practitioner has undoubted opportunities of advancing medicine. We have all met with colleagues in whose judgment we have confidence who, in the course of conversation, have referred to treatment of the value of which they were convinced. Yet when asked why they do not report their observations they will tell you that this had never occurred to them, that others have no doubt come to the same conclusions, that they have kept no records, that they have no access to the literature, that the medical journals would probably not accept such commonplace contributions, and so on. Science progresses step by step. Every proved fact is a valuable contribution to knowledge. The general practitioner has great possibilities of advancing the progress of treatment by his bedside observations. A crusade on these lines would be the best corrective of those two extremes, credulity and therapeutic nihilism, which prepare the ground for the pseudo-science and the "cure-all" propaganda of the present day.

All disease or disorder of function is, speaking generally, due to physical or mental causes and all treatment is consequently either physical or psychical in its mode of action. The diagnosis provides the indications for the requisite therapy. Rational treatment demands a correct diagnosis so far as this is possible, and a true diagnosis, it is to be remembered, consists not in naming a disease but in an attempt to account for and explain all the abnormal signs and symptoms which the case presents. This includes, as the experienced clinician realizes, the sizing up of the patient's attitude to his own case and the correction of his anxieties and misconceptions, so far as this is possible, should these exist. Many of the minor maladies met with in practice are of mental origin and the estimation of the part played by the mental factor is one of the chief difficulties in adjudicating treatment.

TREATMENT OF DISEASES OF THE NERVOUS SYSTEM, ITS INDICATIONS AND LIMITATIONS

Vascular accidents, a consequence of occlusion or rupture of a cerebral artery, are of every day occurrence. No new measures have been devised to cope with these " accidents " when they occur nor is there anything new to record in the way of prevention. Active treatment is to be avoided unless there are obvious indications. Although antisyphilitic remedies have a beneficial effect upon syphilitic changes in the arterial walls, they cannot be expected to influence the softening which is a secondary result, a consequence of interference with the blood supply.

The symptom-complex which results from *spontaneous subarachnoid hæmorrhage*—sudden onset of headache with giddiness, vomiting, drowsiness, neck rigidity, Kernig's sign, subhyaloid hæmorrhages and blood in the cerebrospinal fluid—has been clearly defined of recent years. Repeated lumbar puncture is commended if there is evidence of increasing intracranial pressure which is endangering life. When under such circumstances the presence of a third nerve palsy suggests the presence of a leaking aneurysm in the region of the intracranial termination of the internal carotid artery, ligature of the artery in the neck may be considered.

The term *post-concussional syndrome* has been recently applied to a group of symptoms—headache, giddiness, and so forth—which follow a head injury. In the presence of such symptoms after an accident, the patient should be kept at rest for some days with his head raised on a high pillow. Intravenous injections of hypertonic saline, which no doubt act by reducing the associated cerebral œdema, are helpful if the symptoms are pronounced.

When an *acute meningitis* is suspected, lumbar puncture is called for in order to corroborate the diagnosis and determine the nature of the infection. Should this prove to be meningococcal, the case should be at once transferred to a fever hospital for intrathecal serum treatment. Drainage by repeated lumbar puncture is advocated in all forms of acute meningitis.

Cases of *acute lethargic or epidemic encephalitis*, a disease which has been notifiable for some years though the risk of infection is very slight, have been uncommon since 1924. There is no definite proof of the particular efficacy of any one of the various remedies which have been recommended and employed in its treatment.

Encephalitic Parkinsonism is nowadays the most common organic affection of the nervous system. While no treatment is known to influence the pathological process, certain drugs—hyoscine, stramonium and belladonna—have a definitely beneficial effect upon the rigidity and tremor as also upon the salivation which is often a troublesome symptom. A hundredth to a seventy-fifth or even a fiftieth of a grain of hyoscine hydrobromate by the mouth, three times a day, is often very effective and may be continued indefinitely. The dried extract of stramonium of the U.S. Pharmacopœia, given in pill form in doses of 0·1 to 0·25 of a gram, thrice daily, is especially helpful. Blurring of vision and dryness of the mouth are produced by all these drugs when given in effective doses. The visual disturbance, however, may, if troublesome, be counteracted to some extent by the simultaneous administration of a fifteenth of a grain or more of nitrate of pilocarpine, thrice daily.

The prognosis in cases of *intracranial tumour* is, speaking generally, much more hopeful than it was a few years ago. This is in part due to earlier and more accurate diagnosis, which has been greatly facilitated by radiological procedures, and in part to improved operative technique. Extra-cerebral growths—tumours of the meninges, of the pituitary, and of the auditory nerve—are nowadays often successfully removed. Early diagnosis is very important. Possibly the day may come when some form of selective treatment will be devised which influences cell growth and is applicable to the infiltrating tumours of the brain. Deep X-ray therapy has been used of late both in inoperable cases and after operation in cases in which a tumour has been partially removed. Radiotherapy must, however, be used with caution.

Although there has been no recurrence of the alarming worldwide epidemics of *acute poliomyelitis* which occurred some years ago the public is apprehensive. A recent pronouncement from the Ministry of Health to the effect that when acute poliomyelitis occurs in a residential school the pupils should not be sent home relieves the medical officer of a serious responsibility. Isolation of the patient for three weeks is advisable. The value of treatment by human convalescent serum is still *sub judice*. It is to be hoped that before long some method of protective immunization will be discovered.

The cause of *disseminated sclerosis* has not yet been determined and no treatment has been proved to have a certain effect upon the course of the disease. Conclusions as to the effect of remedies are difficult to arrive at in view of the natural remissions that occur in many cases. Proof that a remedy has been discovered, the effect of which is undoubtedly beneficial, will be forthcoming when it can be shown that under the treatment in question relapses do not occur.

The symptoms of *subacute combined degeneration* of the spinal cord often improve when treated with liver, a remedy which has such a remarkable influence upon the form of anæmia with which these cases are commonly associated. In exceptional instances in which there is an accompanying anæmia of the chlorotic type large doses of iron, given in the form of Blaud's pills, thirty grains or more, three times a day, are it is affirmed very effective.

Pressure paraplegia, a symptom-complex determined by various pathological processes which compress the spinal cord, calls for passing reference. In every case of spastic paraplegia in which the presence of a sensory level points to a local spinal lesion, the possibility of a pressure paraplegia and its relief by operation arises. Diagnosis has been here facilitated by characteristic changes in the cerebrospinal fluid and by specialized methods, including radiological procedures, which are now utilized in the detection of "spinal block."

The incidence of *syphilis of the nervous system* has changed with the more thorough and general treatment of the primary infection. Gummata of the brain, the treatment of which was often so dramatic, are but seldom met with, and severe cases of tabes, at one time so common, are now most exceptional. Potassium iodide is probably as serviceable as the arsenical preparations in the treatment of syphilis of the cerebral vessels, and mercury is still regarded by many authorities as the chief standby in tabetic lesions. While repeated courses of intensive antisyphilitic treatment are indicated in cases of active tabes, the results are not to be gauged merely by the altered reactions in the cerebrospinal fluid. Personal considerations must receive attention for, to quote the words of a distinguished syphilologist, " Man must not be treated as a laboratory animal."

The malarial treatment of *general paralysis of the insane* has given striking results. Many patients so treated are able to return to their employment, and experience has shown that the remissions obtained by this method are much more prolonged than in untreated cases, although sufficient time has not yet elapsed to permit of conclusions as to the permanency of the benefit. This procedure is attended with a definite mortality, the outlook in this disease is otherwise hopeless. Malarial treatment should only be undertaken by one who has special experience of the method.

Multiple neuritis may be due to various causes. The elimination of the causative factor or factors is the first step in treatment. On the other hand, the etiology is often obscure. Alcoholic neuritis is nowadays a comparative rarity. No specific therapy is known which influences the neuritic process. Treatment is consequently limited to the application of measures for the relief of pain, the prevention of contractures, and the maintenance of the nutrition of the muscles so that they may be in a condition to function when the nerves regenerate. Omnopon is a particularly valuable remedy when pain is a pronounced symptom since, unlike other opium preparations, it does not upset the digestion, the dose does not require to be increased, and there is no tendency for the patient to acquire the drug habit. Massage retains its position as a helpful agent in maintaining the condition of the muscles, but it is questionable whether electrical stimulation is as serviceable for this purpose as was at one time believed. Muscular relaxation would appear to expedite recovery, but it must be applied intelligently. If, for example, a " cock-up " splint is used in a case of radial paralysis with wrist drop, care must be taken that the splint does not interfere with the blood supply to the limb and that it is taken down and the joints freely moved from time to time, otherwise permanent contractures may develop.

The treatment of *migraine* demands a thorough inquiry into the patient's daily routine with the object of eliciting possible responsible factors. The correction of a trivial refractive error—and it is the minor errors which are of etiological importance—may be followed by pronounced benefit. Further experience tends to confirm the impression that luminal is often helpful in reducing the frequency and diminishing the intensity of the attacks. It should be given in a dose of one grain, night and morning, with the greatest regularity, for an indefinite period.

Although it is nowadays customary to speak of *the epilepsies* rather than epilepsy, it must be admitted that little is known regarding the varieties which the new nomenclature implies, their etiology, prognosis and treatment. It is almost unnecessary to remind the reader that in every case in which a patient who has passed the age of puberty has an epileptic fit for the first time the possibility of an underlying organic cause must be kept in view. The position of luminal, as at least the equal of the bromides in the treatment of these disorders, has been firmly established. One to one-and-a-half grains should be given at bedtime or twice a day if called for. Luminal must be given with the greatest regularity and it may be taken indefinitely without any ill effects. Eventually the dose must be gradually reduced, for the sudden cessation of luminal may set up the status epilepticus. A ketogenic diet would appear to be sometimes of value in the treatment of the epilepsies. The trouble entailed in the preparation of the diet is, however, a disadvantage. In the treatment of the *status epilepticus* paraldehyde given by the rectum in a dose of six drachms, the dose to be repeated if necessary, is a valuable remedy. The term *pyknolepsy* is applied to a group of cases characterized by attacks which are indistinguishable from petit mal. The attacks occur in childhood, are very frequent, are all of the minor variety, are unaccompanied by mental deterioration and cease spontaneously before, or about the time of, puberty. The fact that the usual remedies which are helpful in petit mal have no influence upon pyknolepsy is of much diagnostic importance.

A variety of disorders, too numerous to mention, have been attributed to disturbance of *the autonomic nervous system.* This is a field which will continue to attract increasing attention. Notable therapeutic results have already been achieved by the surgeon in the treatment of *Raynaud's disease* and *congenital megalocolon,* to mention two striking examples.

The practitioner must be—indeed he has been from the beginning of time—as much a physician of the mind as of the body. A large part of his work consists in the treatment of disorders of mental origin, and in every case with which he meets the possible rôle of mental factors in the production of symptoms demands consideration. *The neuroses,* or *psychoneuroses,* a term which some prefer, are disorders of mental origin in the prevention and treatment of which the practitioner has a serious responsibility. During his undergraduate career he sees little, and hears less, of the common neuroses with which he will afterwards have to deal. Impressed it may be by the ultra-materialistic attitude of some of his teachers, he may feel that these disorders are not worthy of his consideration. On the other hand, he may have been so impressed by hypothetical considerations and by what he has heard of the specialized methods of psychotherapy and their application that he feels he has neither the requisite knowledge nor the time to deal with cases of the kind. Both these attitudes are, needless to say, radically erroneous. With increasing experience the young practitioner will learn that these disorders of mental origin are responsible for much of the disability from which his patients suffer, and that it is the practical personal psychology of everyday life, and not the academic psychology of the classroom or a knowledge of specialized psycho-analytical procedures, which is of real value to him in practice.

The general practitioner meets with the neuroses at an early stage, when they are eminently curable. If he is to be successful in their prevention and management he must learn to visualize every case from the patient's point of view; he must remember that when a patient consults his doctor he usually does so for one of two reasons, either because his symptoms are inconveniencing or incapacitating him or because he fears that they may mean the beginning of some dread disease; he must see to it that he recognizes his patient's anxieties and misconceptions when these exist and corrects them where this is possible. The intelligent patient who is suffering from a neurosis expects from his medical man nowadays an intelligent explanation of his symptoms. While it may be sufficient to clap the patient on the back and tell him there is nothing the matter, the patient may go away saying to himself "The doctor would know that there was something the matter if he had my trouble." In the diagnosis of the neuroses, just as in our diagnosis of organic disease, we must not be content with a name, but must aim at eliciting all the facts and finding an explanation which will account for them. Again, the young practitioner must remember that a psycho-analysis is a highly specialized procedure which is only to be utilized in carefully selected cases, and that it is a method of treatment which should only be undertaken by an expert. Psycho-analysis often necessitates prolonged treatment, the results are by no means always successful, the patient may, so to speak, become addicted to the method, and when psycho-analysis fails the simpler methods of psychotherapy are usually ineffective. The practitioner will find much that will interest and be helpful to him in the treatment of these mental factors in the works of Dejerine upon "The Psychoneuroses" and T. A. Ross on "The Common Neuroses."

SOME HINTS ON THE MODERN TREATMENT OF MENTAL ILLNESS

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THE psychiatrist in the past was a man apart, as he was simply the keeper of those severe forms of mental illness, the sufferers from which we designate as insane; in fact not until the 18th or 19th century was it even considered necessary that the head of an asylum should have any medical knowledge. The first attempts at understanding and dealing with the problem were the results mainly of the work of Pinel in France and Tuke in England. Then came the results of work on delusional insanity, general paralysis and adolescent insanity, with the division of all forms of mania and melancholia, except involutional melancholia, into a group called the manic-depressive psychoses, and there also arose a group designated dementia praecox[1]. Anatomists and physiologists investigated the localization of areas and functions of the brain, biochemistry also dealt with endocrinology and vitamins; serological investigations threw light on the causation of meningitis and assisted in the differentiation of certain forms of encephalitis: malarial therapy[2] provided a further method of treatment in general paresis; encephalitis lethargica was discovered and later divided into its sub-groups of the hyperkinetic and myoclonic forms[3]; and the physiological theory of the unconditioned and conditioned reflexes[4] and the advance of psychological methods and technique, both for investigation and treatment all added to our knowledge and provided means by which a clearer view of the problem of the causation and treatment of mental illness and disorder might be obtained[5]. Lastly, recent work attempting to correlate mental dispositions with certain anthropometric measurements and differences in physiological functioning led to a further method of research which may eventually prove a link through which the work of all investigators may be brought together and correlated[6, 7]. This very rough survey of the history of the growth of Medicine as applied to mental illness will show the extreme complexity of the problem and therefore any dogmatic suggestion as to treatment at the present state of our knowledge is not possible.

TREATMENT IN CHILDHOOD

As in all medical research, investigators have had to delve further and further back into the origins of life in order to elucidate the problem of disease and its treatment, and from attempts to cure end-processes it has been seen that prevention is better than cure, so treatment of mental illness must of necessity follow the same methods. I therefore wish first to give some ideas as to the treatment of children, as it is here that the problem starts. In psychological medicine there is no greater truism than that " the child is father of the man."

Treatment may resolve itself into prophylactic and curative. The clinical experience of all forms of psychotherapy tends more and more to look back further and further into the mental life and experience of the individual for the cause of the mental breakdown. The interest which the general practitioner now takes in child guidance and similar clinics is of itself an indication of a new trend in the medical field. Such well known troubles as enuresis, night terrors, masturbation, apparently causeless lying or thieving, and failure in a hitherto bright child to contend with his school work are among the most common complaints for which the medical practitioner can find no definite physical reason. He may at once discern that a child is subnormal, but he has not been taught any definite technique by which he can demonstrate the condition of subnormality to the parent, and especially is this the case because the interplay between the different psychological functions is not clearly definable. It is impossible for the general practitioner to be certain whether there is primary intellectual impairment, with a consequent loss of emotional control, or whether the main factor is emotional, in other words what is due to inherent constitutional defect and what is due to the child's environment; he will find great difficulty of detection unless trained in the use of an intelligence test[8]. There are many tests in use but personally I have found that of Yerkes and Bridges[9] the simplest and most reliable, and always use it with slight modifications of my own. This test will not only detect the subnormal, but it will often give an indication of what one may call the supernormal, because it is among both these classes that the "problem children," upon which the medical man is often called to advise and treat, are found. Until quite recently treatment has been almost entirely physical. It is not intended for one moment to imply that physical factors do not accompany or even cause some of these symptoms, but in the main they are often psychogenic in origin. The difficulty of treating them very often is due to: (1) The attitude of the parents, who resent anything psychological in the way of treatment because it seems to imply that the child "is mental"; (2) The time element; (3) Want of technique, or in plain words a failure on the part of the powers-that-be to include psychological methods in the curriculum.

While the practitioner realizes quite well the importance of making careful physical examinations of the special senses and the integrity of the central nervous system, how many recognize the importance of stimuli from the autonomic system?[10, 11] These autonomic stimuli coming into consciousness in either feelings of discomfort or pain cause displeasure to the child, hence ideas laden with strong emotion which may influence the formation of habits causing trouble, "so-called nerves," throughout the patient's life. The practitioner will attend to the child who is short-sighted by giving glasses to improve his condition, but latent astigmatism and long sight are often not noticed. One child is obviously inclined to be handicapped in his activities by his sight, whereas the other appears at first to have no inhibition from his vision, and yet the observant man will notice in children at play that some will show an inability to cross a plank over a ditch or run along the top of a wall. He will also notice that the other children often jeer at these. In course of treatment it is almost invariably found that individuals who are suffering from any inequality of vision, especially astigmatism, do not like heights. Even in adults it is frequently found that the idea that they are cowards is often associated with some error of refraction or different focus in the two eyes, and that the idea of cowardice arose at an early age.

The importance of what is said as well as what is done to the child cannot be over-emphasized; to frighten a child with the idea of the "bogey man" to enforce obedience is detrimental. Night terrors may be due either to the autonomic system coming into consciousness, like indigestion, or to some imaginary image implanted in the child's mind by something it has heard said. Many phobias and obsessions are undoubtedly caused in this way, and psychological seeds sown in the minds of children may persist, even into adult life. In the treatment of children every factor must be considered, and that it is not only constitutional hereditary tendencies, but also environmental conditions that have to be studied.

To summarize this section on treatment: In investigating children not only physical conditions should be considered but some form of intelligence test would be of great assistance, giving the medical practitioner a recognized method of questioning which will throw light on the child's attitude and will save much useless effort in detecting the really subnormal. It will probably be found that if more attention were paid to the effect of environment on the psychological factors, the neuroses might be greatly lessened. This, of course, is only a surmise, as there has not yet been time to observe the results on children as to permanent improvement, but there is no doubt that many of these children do improve in a most remarkable manner after psychological treatment. Further, the collection of data about the effects of treatment at the clinics may eventually lead to a better understanding of treating and preventing mental illness.

Lastly it is possible that the constitution and disposition of the individual may be detected by a combination of the anthropometric and observation technique, and that it will be found that there is a tendency for a certain constitution with its physical make-up to have a certain psychological disposition, that is a tendency to subjectivity or objectivity, as it is called, in the very early days of life, therefore the character may be greatly influenced by considering the psychological, biochemical and hereditary factors in each case.

NEUROSIS AND PSYCHO-NEUROSIS

In cases styled nervous it constantly appears that memory for their childhood days is extremely defective. The symptoms of a patient with mental illness are difficult to understand, and unless it is realized that a very careful exploration is necessary of this or that symptom it will be found impossible to treat the patient. The recent tendency of psychological medicine is to the effect that constitutional make-up *and environmental factors must both be considered in treating or attempting to treat either the patient who* is called neurotic, psycho-neurotic or psychotic and that it has necessitated a new technique.

Every neurosis and psycho-neurosis is most easily treatable in the earlier stages. Phobias, obsessions and the more severe forms of neuroses and psycho-neuroses often require long and special treatment, and are invariably of old standing though often attributed by the patients themselves to some shock. Drug treatment in these cases cannot cure and more often than not does harm. If the practitioner will afford the time to investigate carefully the case he will find convincing evidence that, though the shock may be the precipitating factor, many others were the steps that led to the final catastrophe. These are the cases in which analytical treatment seems to be the most effective and surest method of cure. The medical man must realize that obsessions are not necessarily a sign of insanity, though they may eventually lead to it if not treated in an appropriate manner.

The patient should, if possible, be seen first and alone; the relatives should preferably be seen after the patient, and explanations given of how the symptoms complained of by the patient are real though not vital as regards the physical condition. If the relative insists on being interviewed first it is best to explain how important it is that the patient should have a chance of explaining himself or herself to the practitioner. In some cases it may be advisable to see both relative and patient together, and point out any circumstance or event which has come to light that affects them both. Especially is this so with husband and wife and in cases of anxiety with fears of suicide in the minds of the relatives. If medicine has to be given it must be pointed out that it is not the main curative factor and is only temporary, giving the reason why it is used.

In treating what are called "nerves" no attempt should ever be made to trick the patient into admitting that his illness is imaginary. By this I mean that a patient complaining of inability to sleep because of pain, and who has had a drug administered which will induce changes of a biochemical nature lessening the activity of certain physical nervous mechanisms, should never be given an injection of water instead of a hypnotic, nor a simple soda tablet in place of a sedative one. The idea in many patients' minds that aspirin or genaspirin are "sleeping tablets" should be removed by explaining that as they relieve pain so they help a patient to woo sleep. I have known patients refuse these drugs from the fear of acquiring a "drug habit." The patient often hides the real cause of his or her phobia or obsession because of the fear of being called insane. The immediate cause even of depression may in many instances be the fear that others will detect the strain of their great mental effort to hide these phobias.

The fact that the patient realizes that the compulsive idea is false, i.e. is not compatible with the beliefs and actions of others, is the chief factor which should decide the medical man's diagnosis, namely, that the patient is sane and that though sane there is imperative need for treatment or the insight may be lost. It is in this term or rather the understanding of its meaning that the diagnosis of what we term "sanity *versus* insanity" lies, it being understood that insight can be lost by any overload, either physical or mental, and if lost that the loss may be transitory or permanent. Permanent loss may be due to systematized delusions. This mental condition is possibly, some think probably, always due to environmental factors and starts in early life. Not infrequently the parents or parent-prototypes are suspicious and live with their children an isolated existence. These systematized delusional cases are difficult to treat and the term should in my opinion only be applied to cases such as paranoiacs and litigants. Patients with systematized delusions can often live normal lives, they are not detected until the illness is well established, and the treatment is rarely successful as the patient never admits that there is anything wrong with him. The lack of insight is prominent only as regards the delusion. In schizophrenia insight is lost but in a different manner; the make-up of this loss is a replacement of reality by phantasy. The manic-depressive in the melancholic stage has lost insight by belittlement of his or her own value to reality, the manic by over-emphasizing his importance.

It is conceivable that possibly insight is never lost without some serious biochemical or organic changes in the patient. Many subjects of anxiety states (the so-called borderline), fear of suicide and insanity, come to mental hospitals as voluntary patients, but these persons are not psychotics, they rarely commit the act unless their physical health fails. Suicide in my opinion is often an indication that the individual was afraid of losing his reason. In many feeble attempts at suicide it is found that the attempt was caused by a mild form of confusion occurring in an anxiety-hysteria, and many patients have given the reason that they were afraid of going mad and would sooner be dead than insane. I have found that the majority of accomplished suicides occur in those who were never suspected of being likely to commit the deed, people becoming wise to the tendency after the event. This may seem a far-fetched statement, but in an experience of nearly forty years, I have found that free discussion of the tendency and probing the ideas of the patient have in many cases eliminated the tendency. Insight is always lost in cases of confusion, and with it volition is abolished in many cases. By this term it is meant that the patient obviously has lost the power of thinking correctly in terms of time, place and person, and is incapable of expressing willingness or the reverse, to receive treatment. I have specially emphasized insight and volition, because loss of insight, except in confusional cases, means a grave mental illness, whereas loss of volition is often a temporary condition which may clear up completely. Patients without volition should be dealt with, if they have to be sent to a mental hospital, by means of a temporary certificate, as not infrequently they recover and thus the stigma of certification is avoided. The temporary certificate is not at present used by the medical man nearly as frequently as it might be.

Treatment of the psychoses by the medical man in ordinary practice is seldom possible, with the exception of the cases designated "organic reaction types." These may be divided roughly into cases due to (*a*) endogenous toxins and (*b*) exogenous toxins. Puerperal, alcoholic and syphilitic infections are the best known. In influenza epidemics the doctor is only too often suddenly sent for because of an acute attack of confusion occurring in one of his patients. Prompt treatment may often abort an attack, or at the worst may enable the patient to be kept quiet until further action can be taken. Alcoholic psychoses, with the exception of delirium tremens, can seldom be satisfactorily treated except in institutions. It is unnecessary to delay here in discussing delirium tremens, as practitioners probably know more about treatment of this condition than most alienists; but it should be realized that, though the alcoholic psychoses are extremely intractable to treatment when firmly established, the early stages can often be assisted by psychological methods. It can be pointed out to the patient that it is not some inborn condition which he cannot resist, but that the alcohol has frequently been taken to buoy him up against his own sense of shyness or inferiority. This combined with treatment of the general physical health and an effort on the patient's part will very often check the habit in the early stages. Most cases, it is found, have as a basis a sense of fear of the father or father-prototype in men, in other words, they have not been able to approach their fellow men without a distinct sense of insufficiency or guilt. It is advisable to suggest total abstinence. Bribing a child to remain a total abstainer until he is 21 is sometimes an incentive to alcoholic habits rather than to abstinence.

NEURO-SYPHILIS

Syphilitic, puerperal and sudden confusional states, however, are now better understood as to causation, course and treatment. Neuro-syphilis may take many forms, the two forms of this disease presenting mental symptoms are cerebral syphilis and general paresis. These two illnesses both present mental symptoms and are frequently confused one with the other, but the complete differential diagnoses would be too long to go into in this paper. I will attempt to compare the two, i.e. to set out the most characteristic symptoms, as they may help in the very difficult question of diagnosis and therefore of treatment. I especially emphasize the importance of diagnosis, as the treatment of the two conditions is different.

The early diagnosis, especially of general paresis, is of great importance, as the success of modern methods, especially as regards malarial therapy, appear to some extent to depend on treatment being given in the earliest stage.

GENERAL PARESIS	CEREBRAL SYPHILIS
Psychological.—Change in character, especially in judgment, carelessness, loss of interest in family. Memory impaired. Failure to correlate everyday events, dates forgotten and business neglected in a previously careful man. The patient may complain of some of these symptoms, but become irritable	*Psychological.*—Judgment not impaired unless delirious. He does not lose pride in his appearance unless quite demented. There is not the general change in personality as in the G.P.I. Loss of recent memory as in Korsakoff's syndrome.

or indifferent as a rule when the seriousness of the symptoms is pointed out.	
Physical.—Pupillary changes, Argyll Robertson pupil. Inequality, loss of sympathetic reflex. Change in expression. Alterations in speech. Often early difficulties in passing water, loss of propulsive power in bladder. Apoplectiform or epileptiform attacks suddenly occurring without warning and clearing up rapidly, but almost invariably followed by mental deterioration. Tremors, fine of tongue and lips, slurring speech.	*Physical.*—Argyll Robertson pupil rare. Transitory ptosis, dimming of vision, diplopia, optic neuritis, epileptic fits. Headache, especially nocturnal, and partial hemiplegic attacks. The loss of propulsive power of bladder does not occur.

It is important, too, now that general paresis is being treated in general hospitals and also by general practitioners, to draw attention to the following facts: (1) That a positive Wassermann or positive Sigma in the C.S.F. is not diagnostic of general paresis; (2) that the gold-sol test should always be used as a further aid as a paretic or luetic curve will materially assist in diagnosis; (3) that clinical symptoms should be carefully correlated; (4) Pandi's test should be employed.

It is important that a correct diagnosis should be made as otherwise claims may be put forward of cures by treatment of general paralysis, which would be incorrect. In my opinion it cannot be over-emphasized that all four methods should be correlated before any case is treated as general paralysis. Though arsenobenzol preparations are still used as a method of treatment, there is danger of relapse in some cases. These preparations may be of use in cerebral syphilis; we doubt their efficacy in general paresis, also there is evidence that in some cases of the latter disease as a primary treatment they cause acute fulminating exacerbation of the disease, rapidly followed by death. Generally, there is a tendency at the present time to rely more on malarial treatment followed by a course of bismuth injected intramuscularly, and in some cases arsenobenzol preparations. Malarial therapy has now advanced so much that it seems at present the best method of treatment,[13] especially when followed by after-treatment, which is ordinary anti-syphilitic measures with a preference for mercury and bismuth. It should be noted that following treatment by malaria the unitage of the cerebro-spinal fluid is often increased (Sigma test), whereas after a course of anti-syphilitic treatment mentioned above it is decreased, and in cases of complete remission the cerebro-spinal fluid becomes normal. Cases of neurasthenia with any eye symptoms or alteration in mental activity should always be reviewed with suspicion, and the lumbar puncture resorted to in order to test the cerebro-spinal fluid by the various methods I have previously mentioned. Mosquitoes or the malarial blood can be obtained from the Ministry of Health. The subcutaneous injection is 2–4 c.cm., rigors 8–12. After the required number of rigors quinine sulphate gr. x t.i.d. for one week, followed by quinine sulphate gr. x daily for two weeks. The malaria can always be stopped at any stage if desired by quinine sulphate gr. x.

Where the patient should be treated is a difficulty. If treated in a nursing home there should be trained nurses, preferably with mental experience, as some patients may develop acute confusion which is alarming to the ordinary hospital nurse. I have known patients, who have previously had malaria in the tropics, when later treated for general paralysis by induced malaria become acutely delirious with the onset of the rigors. Only the very early cases are eligible for nursing-home treatment. In general hospitals the difficulty is that the patient after the cessation of the rigors will require a further stay in hospital for a month or six weeks with anti-syphilitic treatment, and to get the patient's strength up before he is discharged. This prolonged stay in a general hospital at the present time with any shortage of beds may be difficult to arrange, but nevertheless it is advisable. Another course is now possible under the Mental Treatment Act of 1930, namely, voluntary treatment in a mental hospital. Cerebral syphilis responds to the usual anti-syphilitic treatment; if prominent mental symptoms occur, mental hospital treatment is usually necessary and in the acutely confused cases it is often possible to send them to the hospital under a temporary certificate.

THE ENDOGENOUS AND EXOGENOUS TOXIN CASE

The organic reaction type which probably causes the general practitioner most anxiety, and with which he most commonly has to deal, is the so-called "endogenous and exogenous toxin" case, the mental symptoms of which are confusion to a greater or lesser degree. There is in all these cases a loosening of the normal touch with reality, accompanied by an alteration in the emotional control of the patient. By this I mean that the usually evenly balanced person may become irritable and excitable, the cheery depressed, or there may be a condition of indifference amounting almost to stupor; the symptoms may be of almost any degree of severity. There is often dimness of vision, and if there is astigmatism or unequal visual focus there is often giddiness, a feeling of unreality is complained of and there is a loss of time sense and difficulty in manipulating figures and words, the patient complaining that he cannot take in what he reads. There may be tremors, and often terrifying dreams.

In the second stage the patient becomes sleepless at night, or sleeps in snatches, there is well marked slowness in understanding, spontaneous conversation almost ceases, and questions are answered slowly and with visible effort; sense of time is almost entirely lost, no answer can be extracted about the date of onset of a symptom except with great effort; there is also great anxiety, difficulty in retaining ideas as to place and even persons, the eyes look heavy and often there is blepharitis. The main symptom is lack of energy; patients complain that they cannot sleep, or only in snatches, there may be hypnogogic hallucinations, loss of appetite, constipation, giddiness, failure in ability to concentrate, and sudden attacks of weeping occur without cause, which worry the patient. He is aimlessly restless, and complains that he cannot keep still; later, if the illness is not treated, these symptoms become worse. There is complete loss of volition, incoherence, restless excitement or depression; the patient wildly resists any attempt at restraint, and may try to throw himself out of a window. The temperature is raised, the blood pressure is usually low and the pulse rapid and, as a rule, showing daily fluctuations. The temperature may become subnormal, but the main characteristic is considerable variation between the morning and evening temperatures from day to day, even though the rise may not be above normal. In severe cases the temperature, if it can be taken, always shows some rise. There are often symptoms of extreme terror. This illness may occur in almost any degree, from what appears to be temporary anxiety to almost disintegration of the personality. The onset is often acute, but usually, even in the acute cases, a prodromal stage is generally found. The main symptom, however, is failure in orientation with regard to time, place and persons. The prognosis is often favourable. These cases occur after exhaustion, which almost invariably appears to be associated with (1) strong emotional strains; (2) unexpected shocks caused by the sudden death of a loved relative; (3) acute illnesses; or (4) the puerperal state. In every case there is almost invariably the psychological factor preceding the physical illness of emotional repression connected with the love life of the patient.

Probably the commonest physical factor is so-called influenza. The mental symptoms, however, seldom occur with the onset of this illness and usually appear one to three months after the acute attack. The milder attacks rather than the more severe seem to be followed by mental symptoms, also these confusional states may be the first intimation the medical man has that the patient is ill, the influenza having been ignored by the patient as far as medical treatment was concerned. The main points in treatment are symptomatic and depend on the severity and suddenness of the onset. In the milder cases the main treatment is often psychotherapeutic; the failure to sleep and the fear of inability to concentrate, with the sense of unreality, induce in the patient's mind the fear that he is going mad. Explanation and reassurance that he will get well, especially if the friends are made to grasp that the symptoms are those of illness and will probably disappear, will often so relieve the patent's mind that he will lose a good deal of his fear, especially if he can be made to understand that sleep will be obtained, if necessary, with the aid of medicine.

In the general treatment it is important to get rid of the almost invariable constipation; enemas should be continued if necessary, purgatives avoided. Many cases give a history of constipation of long standing. Taxol at night is one of the most promising adjuvants in after-treatment and the formation of regular habits which have often been absent since childhood. The best tonic in my experience is metatone, and one of the vitamin preparations, such as adexolin, is often of value. If drugs must be used to induce sleep, paraldehyde is by far the best in spite of its unpleasant taste and odour. A preliminary dose of two drachms often acts quickly and is effective; it also has the great advantage of being safe and, if prescribed with

½ dram of liquid extract of liquorice in 1 ounce of water, is tolerated by the patient. Morphine should never be used, as it increases the tendency to hallucinosis; the barbituric acid drugs are contra-indicated in any case showing confusion, as they add to the confusion, partly, I think, by their slow action and also because they almost invariably leave the patient dull and confused when waking up. This group of hypnotics, too, is variable in action, even in the same individual. Any sudden waking of the patient after their use may be followed by quite acute attacks of hallucinosis and even violence. Bromide, too, is of little use in confusion except in children and often may have the effect of making the patient less responsive to reality owing to the effect on the higher centres. In very mild cases the restlessness is often a marked feature and may be met by allowing exercise in moderation. The psychological effect of calming and reassuring the patient is of great importance in these cases. Any attempt to analyse such patients while still in a state of confusion should be deprecated, though on recovery analysis will often prove valuable. As long as insight can be maintained the case can be treated at home, though the patient should always have someone to nurse him and be with him as even in mild cases there may be greater confusion or apprehension at night.

The practitioner must be guided by the patient's condition as to the depth of confusion, and also as to past history of the patient's case, with any marked previous tendency to hysteria, schizophrenia or depression. These cases require constant observation, as the tendency to sudden outbreaks of fear and confusion may cause them to wander out at night, or in the confused state to injure themselves. It is seldom possible to nurse the severe cases at home, but the general practitioner may have to deal with them until they can be moved. The confusion and restlessness is often so great that no medicine can be given by the mouth, in which case hyoscine is the most useful drug: 1/100 grain can be given at once, or if there is no sign of any idiosyncrasy to its action 1/50 or even 1/25 can be given with safety, in fact in very severe cases it may only be possible to feed the patient when he is under this drug. The bowels should be attended to by enemas. If the patient is extremely restless, even when there is some rise of temperature, it is sometimes more advisable to let him wander about, provided he does not injure himself, rather than to exhaust him by the struggling necessary to keep him in bed. These cases require removing to a mental hospital, a nursing home approved by the Board of Control, or to a general hospital which accepts such cases. The statutory form to use is the temporary certificate, as the patient is always without volition and should therefore not be certified in any other manner. If the relatives insist that the patient should be nursed at home, two day and two night nurses will often be wanted, and these should have some mental training.

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THE MODERN TREATMENT OF SOME GASTRIC AND INTESTINAL DISORDERS

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MODERN methods of treatment are not necessarily the best. I have therefore not hesitated in the following somewhat disjointed remarks to criticize certain methods of treatment which have been recently introduced or reintroduced, and to advise the practitioner to avail himself of well-tried older methods when experience has shown that they are preferable.

GASTRIC, DUODENAL AND ANASTOMOTIC ULCER

It is still insufficiently realized that chronic ulcers require prolonged treatment. It is rare for the smallest ulcer to heal in less than four weeks, and large ones may require as long as three months, but if suitable treatment is given for a sufficient period nearly every gastric ulcer eventually heals, as well as the majority of duodenal ulcers and about 50 per cent. of the much more intractable ulcers which so frequently follow gastric operations. The systems of treatment which give a different diet for each successive week are most illogical, as what is suitable for the first week must continue to be suitable as long as healing is incomplete. The strict diet should be given without alteration until all spontaneous discomfort, tenderness and rigidity have disappeared, no occult blood is recognizable by the most delicate form of guaiac test and by the spectroscope, and the X-rays show complete disappearance of the crater. In no case should it be continued for less than four weeks. When the ulcer has healed the patient can pass at once to an intermediate diet, which he should follow for two or three weeks, and then begin the post-ulcer regime, which he should keep to for the rest of his life. The only people who develop chronic ulcers are those who are born with certain types of stomach, which form part of the individual's physical make-up and remain unaltered as long as he lives. If, however, the ulcer has once soundly healed and is not merely latent, as it is after the insufficiently strict and insufficiently prolonged treatment usually given, and if obvious foci of infection in the mouth, throat and nose are adequately dealt with, he is unlikely ever to have a recurrence. The same post-ulcer regime is required after gastro-jejunostomy, or a jejunal ulcer is likely to develop sooner or later.

The feeds should be given hourly. Milk should be the main ingredient. It is a very efficient alkali, as it neutralizes an equal volume of gastric juice containing 0·3 per cent. hydrochloric acid. If five ounces are given every hour, the gastric contents remain completely neutralized during the greater part of the day. Recent observations have shown that individuals with chronic ulcer secrete large quantities of very acid gastric juice throughout the night, whereas little or none is secreted in the average normal stomach. Patients should therefore be instructed to take additional feeds every time they wake during the night, and in severe cases it may even be advisable to wake the patient once or twice to give additional milk, or to give hourly feeds through a Ryle tube kept in the stomach during the night. It is impossible to go into every detail of the treatment, but the following summaries give an idea of the strict treatment and the post-ulcer regime I use. Naturally both have to be modified to suit each individual patient.

ULCER DIET

(1) Every alternate hour from 8 a.m. to 10 p.m. 5 oz. of milk. This can be warm or cold and may be flavoured with tea.

(2) Every other hour, alternating with (1), from 9 a.m. to 9 p.m., a 5 oz. feed, which may be made of any of the following :—

(*a*) Arrowroot, farola, Benger, junket, custard; to any of these red currant, apple or other fruit jelly can be added, and the junket may be flavoured with chocolate.

(*b*) At least two should consist of a thick soup or semi-solid purée of potato, artichoke, cauliflower or parsnip.

(3) A rusk with butter should be eaten with three feeds. Small quantities of water may be drunk between feeds. Half an ounce of strained orange juice should be taken with one of the drinks.

(4) 1 oz. of cream should be added to the 11 a.m., 1 p.m. and 5 p.m. feeds, and ½ oz. of olive oil should be taken before the 9 a.m., 2 p.m., and 7 p.m. feeds.

(5) 1 drachm of Mixture 1 should be added to each milk feed, and one or less drachm of emulsio magnesiæ, according to the condition of the bowels, should be taken immediately before.

(6) 1 drachm of Mixture 2 before the 8 a.m. and 3 p.m. feeds, and 2 drachms before the 10 p.m. feed.

(7) 1 drachm of prepared chalk to be taken half-way between feeds when any heartburn or discomfort is present.

(8) At 7 a.m. ½ oz. powdered charcoal washed down by 5 oz. of water.

(9) Wash the mouth out after each feed.

(10) No smoking allowed during the strict treatment.

(11) During the night the patient should have citrated milk by his bedside, so that whenever he wakes he can take a feed.

MIXTURE 1

Sod. citratis	gr. x
Aq. ad	ʒi

MIXTURE 2

Atropinæ sulphatis	gr. 1/200
Aq. ad	ʒi

The dose should be increased each day until dryness of the mouth or paralysis of accommodation occurs.

POST-ULCER REGIME

To be Followed Permanently

Avoid alcohol except, if desired later on, a small quantity of light wine or diluted whiskey at meals. Avoid effervescing drinks and coffee.

Avoid all pips and skins of fruit (whether raw, cooked, or in jam, and currants, raisins and lemon-peel in puddings and cake), nuts, and all unripe fruit. For example, an orange may be sucked but not eaten. Currants, raisins, and figs are particularly undesirable. Avoid all raw vegetables, whether taken alone (celery, water-cress), or in pickles or salad; green vegetables must be passed through a sieve and mixed with butter in the form of a purée. Porridge is only allowed if made with the finest oatmeal.

Avoid vinegar, lemon-juice, sour fruit; spinach; fried fish; pepper, mustard, curry, chutney, excess of salt; new bread; tough meat, pork, made-up dishes, high game, clear and thick meat soup. During the first six months after recovery from an ulcer it is best to avoid butchers' meat altogether.

Take plenty of butter and cream, and a tablespoonful of olive oil before each meal.

Eat slowly and chew very thoroughly. An adequate time should be allowed for meals, and rest for at least a quarter of an hour before and after meals. Meals must be punctual.

Don't smoke excessively. No smoking at all if any indigestion.

For six months.—A meal or feed should be taken at intervals of not more than two hours from waking till retiring, and again if awake during the night. The feeds should consist of a glass of the following mixture, which should be prepared each morning: 35 oz. of milk, 5 oz. of cream, and 120 grains of sodium citrate.

After six months of complete freedom.— A feed should be taken in the middle of the morning, on going to bed, and again if awake during the night, in addition to breakfast, lunch, tea and dinner.

A teaspoonful of the "alkaline powder" * in a little water should be taken an hour after meals and also directly the slightest indigestion or heartburn is felt. Alternatively, the atropine mixture can be taken before meals.

The bowels should be kept regular be means of the magnesia in the alkaline powder, and, if necessary, liquid paraffin, but no other aperients should be taken.

Have your teeth attended to by your dentist regularly every six months.

Take no drugs in tablet form.

If you have the slightest return of symptoms, go to bed on a strict diet, and consult your doctor, and do not wait for the symptoms to get serious.

ALKALIS; ALKALOSIS

I have already pointed out that milk is the best of all alkalis. But the acid of the gastric juice curdles the milk, which is subsequently further clotted by the action of rennin. Sodium citrate is an efficient alkali; when added to the milk it neutralizes any acid which is already present and makes rennin inactive. Milk of magnesia is also a useful alkali, which should be given in just sufficient quantity to keep the bowels regular. The popular triple carbonate powder has many disadvantages; sodium bicarbonate is the most powerful of all stimulants of gastric secretion and produces an enormous rise in acidity after the initial neutalization; magnesium carbonate has the disadvantage compared with milk of magnesia of giving off carbon dioxide like all other carbonates; and bismuth oxycarbonate is not an alkali at all, being completely inert as well as very expensive. In the unlikely event of any discomfort or heartburn being experienced when a suitable diet with the addition of sodium citrate and magnesia is taken, half to one teaspoonful of prepared chalk can be taken as often as necessary. This has the advantage of being insoluble, so that after complete neutralization has occurred the excess of alkali is not absorbed and there is thus less tendency for alkalosis to develop than with the soluble alkaline salts.

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* The "alkaline powder": 5 parts of "prepared chalk" with 1 part of "light oxide of magnesia." The proportions should be altered according to the state of the bowels.

It is important to avoid giving the excessive doses of alkalis sometimes recommended, as they frequently cause alkalosis which is far more common than is generally supposed. When a patient with ulcer begins after a time to be irritable and complains of anorexia, nausea and headache, it is almost certain that his blood urea will be found to be raised, and that the temporary omission of all alkalis will make him comfortable again. Occasionally more serious symptoms occur, and I have known these to give rise to a suspicion of some serious complication or independent disease by doctors unfamiliar with the possibility of alkalosis.

THE STOMACH-TUBE

(1) In about 80 per cent. of cases of achlorhydria the normal secretion of gastric juice can be restored by a suitable diet, removal of septic foci in the mouth, throat and nose, and gastric lavage. The stomach should be washed out with dilute hydrogen peroxide (½ oz. to a pint) every morning when the patient is fasting until no more mucus is brought away. The treatment is continued until the resting juice is free from mucus, and any gastric symptoms, such as nausea, epigastric discomfort and anorexia, have disappeared.

(2) Pyloric obstruction has generally been regarded as an indication for surgery. The majority of cases, however, are caused by reflex interference with the normal activity of the sphincter (achalasia or spasm) caused by a duodenal or, much more rarely, a prepyloric or even lesser curvature ulcer, together with congestion and œdema of the mucous membrane in the immediate neighbourhood of the ulcer. It is therefore always worth while to try the effect of medical treatment, combined with evacuation of the stomach last thing at night. Lavage is unnecessary, but no food

should be given for three or four hours before the tube is passed. The quantity evacuated often becomes rapidly smaller; when it no longer exceeds 5 oz. the use of the tube should be discontinued. If the gastric stasis remains unaltered, organic pyloric obstruction must be present, but even then preliminary treatment of this kind for two or three weeks renders the subsequent operation much safer, especially if at the same time plenty of fluid and salt are given by the rectum to correct the dehydration and hypochloræmia.

(3) When severe hæmatemesis recurs in spite of the usual treatment, lavage with ice-cold water to remove clots and stimulate the stomach to contract is almost invariably followed by complete cessation of hæmorrhage. It requires some courage to carry out this treatment, but I have several times used it successfully when a patient appeared to be in imminent danger of death.

(4) Acute dilatation of the stomach can always be controlled by aspiration of the gastric contents through a Ryle tube kept in the stomach, every quarter of an hour day and night till recovery takes place.

(5) Einhorn's treatment of ulcer by feeding through a tube introduced into the jejunum has no advantage over the usual treatment and has been almost completely given up in America, where it was at one time popular. There is nothing in the stomach to neutralize the free acid which is secreted each time a feed is introduced into the jejunum, whereas one of the chief objects in the usual treatment is to give a diet which neutralizes the acid as it is secreted.

CONSTIPATION

The rational treatment of constipation depends upon a knowledge of the normal physiology of the colon. The digestion of proteins, carbohydrates and fat, and the absorption of the products of digestion are almost complete by the time the ileo-cæcal sphincter relaxes and allows the contents of the terminal ileum to enter the cæcum. The so-called " haustration " of the colon seen with the X-rays is not, as was formerly thought, a fixed anatomical condition, but represents one phase of the very slow contractions which are constantly churning the intestinal contents and thereby promoting absorption of water; the movements, though too slow to be recognized with the naked eye, are obvious when radiograms taken at intervals of three minutes are compared with each other. After each meal a gastrocolic reflex leads to " mass peristalsis," which carries a large part of the contents of the proximal colon into the distal colon. The routine of getting up, having a bath, breakfasting, and finally sitting down in the w.c. result in defæcation—a conditioned reflex which develops in infancy when the baby is trained to defæcate on being placed upon a chamber. The whole colon takes part in normal defæcation, everything beyond the splenic flexure being evacuated and everything proximal to the splenic flexure being carried forward for a varying distance, so that the proximal colon is once more empty and ready for the day's work.

Constipation is almost always due primarily to impairment of the conditioned reflex upon which defæcation depends. A pelvic cæcum, a low transverse colon and a long pelvic colon are normal anatomical variations and never give rise to constipation or other symptoms; ileal stasis, kinks at the flexures and atony of the cæcum are pure myths. Inefficient defæcation—dyschezia—may be confined to the rectum or pelvic colon, but it is also responsible for stasis in the proximal colon, which, as I have already pointed out, is evacuated when the act of defæcation is efficiently performed.

It is clear that the treatment of constipation should be mainly concerned in restoring the lost conditioned reflex upon which the evacuation of the colon depends. When a patient consults his doctor on account of constipation he is generally already treating himself with purgatives. These all have the effect of hastening the passage of chyme through the small intestine, so that the proximal colon is filled with fluid material containing undigested food. This promotes bacterial activity and enormously increases the quantity of toxic material absorbed from the bowel; fortunately, however, the detoxicating activity of the liver and the excretory activity of the kidney generally prevent the development of symptoms of intestinal toxæmia. The over-stimulation of the colon by purgatives leads to spasm and consequent pain, and the irritation of the mucous membrane may give rise to catarrhal colitis.

Twenty-five years ago Mathieu wrote that in his experience more cases of colitis had been produced in Plombières than ever went there for treatment. It is sad to note that the intestinal douche, which was gradually falling into disuse, has become resuscitated in a more undesirable form than ever, the double Plombières wash-out being now replaced by continuous lavage with many quarts of water, an hour or more being occupied in this activity, which is as harmful in its effect on the patient's mind as it is on his colon.

The motor activity of the bowels should be stimulated by the normal stimulants contained in food, fruit being taken with each meal and green vegetables or salad with lunch and dinner, but so far as possible all chemical irritation by aperients and mechanical irritation by bran and certain modern bread substitutes should be banned. On the other hand, paraffin and vegetable mucilages which swell in water to form a jelly are often very useful; the fæces are made softer and more bulky and thus easier to expel.

On this regime the patient should make an attempt every morning after breakfast to open his bowels, even if he has not the slightest inclination to do so. He should, in fact, try to restore his lost defæcation reflex and should make the most of all the accessories which formerly helped to build up the conditioned reflex, when his bowels acted regularly without artificial aid. An important part of the normal conditioned reflex is that it is performed without thought, and most of the difficulties experienced in defæcation are due to inhibition caused by taking too much thought about it, and not remembering that man was not made for his bowels but bowels were made for man. He should follow Sir James Goodhart's advice to do as the dogs do and never look behind him.

MEGACOLON

Hirschsprung's disease in children and the much more common megacolon of adults can always be kept under control by non-operative measures. Dilatation by bougies, preferably with the aid of diathermy, has exactly the same effect on the sphincter as lumbar sympathectomy, which was primarily recommended by Wade with the object of overcoming the obstruction caused by anal achalasia. This simple treatment not only saves the patient from the risk of a big operation, but does away with the disadvantage of interfering with the nervous control of the distal part of the colon. It is essential that the pelvic colon should be emptied by enemas at the onset of treatment, and in severe cases it is advisable to wash it out once a week, though no aperient should ever be given. The improvement which sometimes follows sympathectomy is due, I believe, to the preliminary evacuation of the bowels rather than the operation itself, for the contractile power of the colon is often maintained to a remarkable extent, an enormously dilated pelvic colon contracting down to a quarter of its size after evacuating an accumulation of several pounds of fæces and large quantities of gas. I have, however, seen several patients who were not in the least benefited by the operation, and one in whom temporary improvement was followed by acute obstructive symptoms. I believe that the operation of lumbar sympathectomy, which is now almost as popular as colectomy was before the war, will soon fall into equally well-merited oblivion.

THE MODERN TREATMENT OF DIABETES

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THE discovery of insulin entirely altered the treatment of diabetes mellitus, and many of the patients who would have died of coma in 1923 are now alive and able to lead active and useful lives. During these ten years the composition of the diet has been altered from a low-carbohydrate-high-fat diet to a high-carbohydrate-low-fat diet, but it is not yet certain that the ideal diet has been ascertained.

DIAGNOSIS

When a reducing substance has been found in the urine, the diagnosis should be established before any change is made in the diet. It is necessary to estimate the blood sugar about two hours after a meal at which at least 2 oz. of bread has been eaten, and if it is not raised above 200 mg. per 100 c.cm. a full sugar tolerance test should be performed.

TREATMENT

(1) *Very mild cases.*—Sugar is occasionally found in the course of a routine examination although the patient feels quite well. The glycosuria in this type of case may be prevented by slightly reducing the carbohydrate intake. The substitution of saccharine for sugar in tea or coffee will reduce the carbohydrate intake by 40 grams, if two lumps of sugar have been taken four times a day (4 × 10 = 40). If the glycosuria disappears the patient must be regarded as a potential diabetic, and the urine passed after the evening meal (not the early morning specimen, which is least likely to contain sugar) should be tested daily, and later on once a week. If this precaution is neglected the glycosuria may return and may pass undetected until the patient has definite symptoms of the disease, and insulin may then be necessary.

(2) *Mild and moderately severe cases.*—The best

treatment is to give insulin with an appropriate diet at once, but few patients, especially those past middle age, will accept this on account of a prejudice against insulin, for which various statements, chiefly in the lay press, are responsible. The following reasons are usually given by patients for being unwilling to start insulin: (1) Once insulin has been started it can never be discontinued; (2) the inconvenience of having to take insulin and meals at regular intervals; (3) the pain of the injection; (4) the necessity of having a doctor or nurse to give the injection; (5) the belief that it is wrong to have any injection.

These objections can be answered in the following way: (1) Patients who require over 40 units a day will be ill, and may die in coma if insulin is discontinued, but this is not the case with the great majority of patients. A few make such a good recovery that insulin is unnecessary; many who take small amounts could give it up without being much worse, if the diet were simultaneously reduced, but continue it because they do not wish to reduce their diet and run the risk of feeling ill. (2) The best results are obtained if the insulin and meals are taken punctually, but little harm will follow if the unpunctuality only occurs occasionally. (3) The pain is very slight if a sharp-pointed needle (No. 19 or 20) is used. (4) The patient can be taught to give the injections himself, and usually prefers to do this. Children of eight, or even younger, learn to do it very easily. (5) No argument is of any avail if this attitude is adopted. The threatened onset of coma will sometimes alter the point of view.

It is most unfortunate that, in spite of much research, no way of giving insulin by mouth has been discovered. Many preparations are advertised as having good effects when given by the mouth, but with one exception they are all valueless. Synthalin does in some cases have an action like that of insulin, but it is a slight one. It has the great disadvantage that it often causes dyspepsia, vomiting and jaundice.

It is only worthy of trial if a patient, who really needs insulin, refuses to take it.

The treatment can be started in two ways:—(1) A diet is chosen which is just sufficient for the basal needs of the body. (2) A short period of undernutrition is given, followed by a rapid increase in the diet. If the first method is chosen the caloric requirements should be calculated. This can be done accurately by means of the appropriate tables, but an approximate result can be obtained by multiplying the patient's weight by 11·3, and this will only vary a few calories from the correct answer. The method is inaccurate for young children, and the following table must be used to get an approximate figure.

Weight.	Calories per lb.	Total.
22	27·5	605
23–33	25	575–825
34–44	23	782–1012

The principle on which a diet is arranged can best be explained by means of an example, but it is unnecessary to make calculations for every patient. An adult who weighs 132 lbs. will require (132 × 11·3) 1491 calories. This number of calories is divided between the carbohydrate, protein, and fat in the following way. The amount of protein is first settled.

An adult requires 0·5 gram of protein per 1 lb. of body weight.
A child of 12 requires 1 gram " " " "
" " 6 " 1·5 grams " " " "
" " 2 " 2 grams " " " "

For an adult of 132 lbs. the allowance is 66 grams. This figure multiplied by 4·1 (the caloric value of protein) gives 270 calories, and leaves 1227 for division between the carbohydrate and fat. In order to prevent any ketosis, the balance between these two must be carefully struck. The carbohydrate should not be less than 70 grams (see later). This figure multiplied by 4·1 (the caloric value of carbohydrate) gives 287 calories; 1227 minus 287 leaves 940 calories for the fat, and this figure divided by 9·3 (the caloric value of fat) gives 101 grams for the fat. The diet is then prescribed as carbohydrate

(C) 70 grams; protein (P) 66 grams; fat (F) 101 grams; calories (Cals.) 1497. The total amount of calories is divided into four meals, of approximately the following amounts:—Breakfast, lunch, and dinner: C. 20 grams; P. 20 grams; F. 30 grams; Cals. 443; Tea: C. 10 grams; P. 6 grams; F. 11 grams; Cals. 168.

This mass of figures seems very formidable to anyone who is unaccustomed to thinking of food in this way. Actually the diet is easily understood and with the use of tables causes little trouble. A simple method called the Line Ration was introduced by Lawrence. He balanced a carbohydrate ration of 5 grams called a Black Line, against a protein and fat ration of 7 grams protein and 15 grams fat, called a Red Line. The diet was then prescribed as so many Black and Red Lines per meal. The patient who wishes to vary his diet looks up the very simple tables and choses his own meals. This method has become very popular, but it now requires some alteration, as the fat ration is very high, according to the recent work on the optimal balance of fat and carbohydrate. This can best be done by reducing the value of the fat in the protein and fat ration from 15 to 7 grams, and taking 1 oz. of meat as the standard instead of 1 oz. of bacon. It is necessary to order some additional fat in the form of butter.

The following tables are drawn up on this principle:—

FOOD TABLES.

PROTEIN AND FAT FOODS

The following portions contain about 7 grms. protein and 7 grms. fat, and may be exchanged one for another without causing any real difference in food values.

MEATS	OZS.	FISH	OZS.
Beef	1	Herring (salt or fresh)	1
Lamb	1	Salmon	1
Mutton	1	Sardines	1
Pork	1	Mackerel	1¼
Veal	1		
Tripe	1½	*With the addition of* ¼ oz. Butter—	
Ham	¾	White Fish	1¼

With the addition of ¼ oz. Butter :—

Chicken	1 oz.
Rabbit	1 ,,
Game	1 ,,

With the reduction of ⅓ oz. Butter :—

Bacon	1½ ozs.

MISCELLANEOUS

1 Egg	
Cheese	¾ oz.
Milk (also 10 g. C.)	7 ozs.
Bread (also 45 g. C. but no F.)	3 ,,

FATS

(The following portions contain about 5 g. of Fat.)

Cream (average)	1 oz.
Cream (Devonshire)	¼ ,,
Butter	¼ ,,

FOOD TABLES.

CARBOHYDRATE FOODS*

Each portion contains about 5 grms. of Carbohydrate

	oz.			oz.	
Biscuit (plain)	¼	= 5 g. C.	Milk	3½	= 5 g. C.
Bread	⅓		Oatmeal (dry)	¼	
Force or cornflakes	¼		Rice or tapioca (dry)	⅕	

VEGETABLES

The vegetables in Group I. contain so little carbohydrate that the amount in an average helping can be neglected.

GROUP I.

Asparagus.
Cabbage.
Cauliflower.
Celery.
Cucumber.
French Beans.
Jerusalem Artichokes.
Lettuce.
Mustard and Cress.
Radishes.
Rhubarb.
Seakale.
Spinach.
Water Cress.

GROUP II.

	ozs.	
Brussels Sprouts	6	= 5 g. C.
Leeks	6	
Marrow	8	
Tomatoes	8	
Turnips	5	

GROUP III.

	ozs.	
Beetroot	2	= 5 g. C.
Carrots	3	
Onions	3	
Parsnips	2	
Peas (green)	1½	
Potatoes	1	

FRUITS

(Weighed with stones but no peel.)

	ozs.			ozs.	
Apple (raw)	2½	= 5 g. C.	Grape Fruit	3	= 5 g. C.
Apple (stewed)	3½		Grapes	2	
Apricot (fresh)	4		Greengage	3	
Banana	1		Melon	7	
Blackberries	4		Orange	3	
Cherries	3		Peaches	3	

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* After R. D. Lawrence, "The Diabetic Life," J. & A. Churchill.

FRUITS—*continued*

(Weighed with stones but no peel.)

	ozs.			ozs.	
Currants (red or black)	5	= 5 g. C.	Pears	2½	= 5 g. C.
Damsons	4		Plums	2	
Gooseberries (raw, ripe)	3		Raspberries	6	
Gooseberries (unripe, stewed)	11		Strawberries	4	

Chestnuts - - - ½ oz. = 5 g. C.

In our example the breakfast advised was C. 20 g.; P. 20 g.; F. 30 g.; and this can now be ordered as 4 carbohydrate rations, 3 protein-fat rations (this will be spoken of as the P.F. ration) and ⅓ oz. of butter. The other meals can be ordered in the same way. The diet for the whole day will consist of 14 C. rations, 10 P.F. rations, and 1 oz. of butter-making C. 70 g.; P. 70 g.; F. 100 g. If the same number of Lawrence rations were used the fat would be 150 g.

The alternative method of starting the treatment with a short period of under-nutrition has been largely replaced by the use of the maintenance diet, with insulin. It is, however, a very useful method if the patient is unwilling to start insulin. It is important not to give a fast of more than one day's duration, and it should not be repeated except under special circumstances. The following method, called the Ladder Diet at St. Bartholomew's Hospital, is simple and can be easily carried out:—

THE LADDER DIET

The treatment may be started with one or two hunger days, during which as much tea, coffee, or fresh lemonade as desired may be drunk, and meat essence taken at two meals.

DIET I.—

This should be taken for one or two days.

	Ozs.	Carbohydrate Grams.
BREAKFAST.		
1 egg, weak tea or coffee		
LUNCH.		
Tomato (with lettuce or other salad in Group I. if liked)	2	1·5
Coffee		
DINNER.		
Meat essence or clear meat soup		
Meat	2	
Green vegetables (*See* Food Tables, Group I.)	6	2·0

	Ozs.	Carbohydrate Grams.
TEA.		
Tomato (with lettuce if desired)	2	1·5
Weak tea		
SUPPER.		
Meat essence or clear meat soup		
Fish	2	
Green vegetables (Group I.)	6	2·0
Allowance for whole day: Milk	3½	5·0
Butter	1	
		12·0

Carbohydrate (C.) 12 grms., Protein (P) 36 grms., Fat (F.) 48 grms., Cal: 646.

If the urine still contains sugar, treatment with insulin should be started.

DIET II.—

Add 1 egg to the lunch, and 1 oz. fish to supper, making C. 12·0 grms., P. 48·5 grms., F. 54 grms. Cal: 750.

DIET III.—

Add 1 oz. bacon to the breakfast, making C. 12·0 grms., P. 53·6 grms., F. 69 grms., Cal: 910.

DIET IV.—

Add 3½ oz. milk at dinner (as junket or custard if desired) and 1 egg at tea. This should be arranged in the following manner:—

	Ozs.	Carbohydrate Grams.
BREAKFAST.		
1 egg		
Bacon	1	
Weak tea or coffee		
Tomato	2	1·5
LUNCH.		
1 egg		
Coffee		
DINNER.		
Meat essence or clear meat soup		
Meat	2	
Green vegetables (Group I.)	6	2·0
Milk (as junket or custard if preferred)	3½	5·0
TEA.		
1 egg		
Tomato (with lettuce if desired)	2	1·5
Weak tea		
SUPPER.		
Meat essence or clear meat soup		
Fish	3	
Green vegetables (Group I.)	6	2·0
Allowance for whole day: Milk	3½	5·0
Butter	1	
		17·0

The above contains C. 17 grms., P. 63·7 grms., F. 78 grms., Cal: 1057.

DIET V.—
Add 1 portion of fruit, containing 5 grms. carbohydrate (*See* Food Tables) to breakfast and supper.
C. 27 grms., P. 63·7 grms., F. 78 grms., Cal: 1098.

DIET VI.—
Add ½ oz. of bread at breakfast and ½ oz. of bread at tea.
C. 42 grms., P. 66 grms., F. 78·3 grms., Cal: 1170.

DIET VII.—
Add ½ oz. of bread at dinner, and ½ oz. of bread at supper.
C. 57 grms., P. 68·4 grms., F. 78·6 grms., Cal: 1242.

DIET VIII.—
Add ½ oz. bread at breakfast.
C. 64·5 grms., P. 69·6 grms., F. 78·7 grms., Cal: 1278.

DIET IX.—
Add ½ oz. of bread at dinner.
C. 72 grms., P. 70·8 grms., F. 80 grms., Cal: 1314.

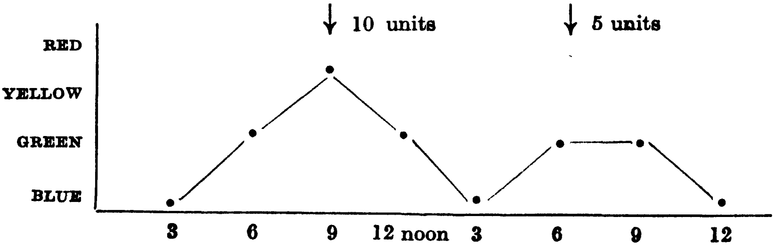
DIET X.—
Add 2 oz. of ham and deduct 3 oz. of fish at supper.
C. 72 grms., P. 71·4 grms., F. 97·5 grms., Cal: 1495.
This should be arranged as follows:—

	Ozs.	Carbohydrate Grams.
BREAKFAST.		
2 eggs		
Bacon	1	
Tomato	2	1·5
Fruit, amount in list, containing 5 grms. C.		5·0
Bread	1	15·0
Weak tea or coffee		
DINNER.		
Meat essence or clear meat soup		
Meat	2	
Green vegetables (Group I.)	6	2·0
Bread	1	15·0
Milk (as junket or custard if preferred)	3½	5·0
TEA.		
1 egg		
Tomato (with lettuce if desired)	2	1·5
Bread	½	7·5
Weak tea		
SUPPER.		
Meat essence or clear meat soup		
Ham	2	
Green vegetables (Group I.)	6	2·0
Fruit, amount in list, containing 5 grms. C.		5·0
Bread	½	7·5
Allowance for the day: Milk	3½	5·0
Butter	1	
		72·0

When the ladder diet is used, the urine in a mild case becomes sugar free after the second or third day, and the diet should be increased every day, to Diet X. This has the same value as the maintenance diet chosen in our example. If no sugar has appeared when Diet X is reached, the protein-fat ration should be kept constant, but the carbohydrate should be increased by 10 g. (two C. portions) every three days until 100 g. (ten C. portions) are being eaten.

Insulin.—If the glycosuria does not disappear after two days of the ladder diet, insulin should be started and the increase in the diet continued as before. If the patient has been given a maintenance diet, the glycosuria will continue except in the mildest of cases, and insulin should be started either on the second or third day. When insulin was first used, the blood sugar was estimated nearly every day, and sometimes two or three times a day, but this is unnecessary now that the principles of treatment are understood, provided that, so far as is possible, every specimen of urine is tested and charted.

SPECIMEN OF CHART



The initial dose should be 5 units, if very little sugar is present, but 10 units are usually necessary. Even if sufficient insulin is given, the urine 0—3 hours after the injection will still contain sugar, but that of the 4—6 hour period will be free from sugar. If the 4—6 hour period contains sugar after two days, an evening dose of insulin should be given. The insulin should be increased by 2 units every other day, until the urine becomes sugar-free. In severe cases the increase must be made more rapidly, according to the condition of the patient, and no rules can be laid down. This method of controlling the insulin dosage is very convenient, but is liable to two errors, depending on the threshold of the kidney, and the blood sugar must be estimated at intervals. The best times to estimate the blood sugar are before each dose of insulin, and some 3—6 hours after it. In practice, unless a patient is in a nursing home or hospital, the blood should be collected immediately before the midday meal, or before the evening insulin, but it is sometimes necessary to collect the blood at all four times. The blood sugar before the morning and evening insulin should not be higher than 120 or 130 mg. per 100 c.cm.; if it is higher than this in the morning, it is probable that the blood sugar will rise above 180 mg. after breakfast, and the evening insulin should be increased by 2 units. If it is higher than 150 mg. in the evening the morning dose should be increased by 2 units. The blood sugar 4—6 hours after breakfast should be between 100 and 120 mg. per 100 c.cm.; if it is lower than this the patient may suffer from hypoglycæmia, and the morning dose of insulin should be reduced by 2 units; if the blood sugar is above 130 mg. per 100 c.cm., the morning dose of insulin is not quite large enough, and should be increased by 2 or more units.

In the mild and moderately severe case the blood sugar can easily be kept within the normal limits, and this affords the best chance of giving up insulin. In the very severe cases, it is often difficult to do this, as the patient may suffer severely from hypoglycæmia at midday or in the night. The hypoglycæmia often can be prevented by giving "buffer" meals at 11 a.m. and 10 p.m., but it is sometimes necessary to give three doses of insulin a day. But, if the patient's comfort is disturbed by the attacks of hypoglycæmia, the attempt to keep the blood sugar normal must be abandoned, and some glycosuria (a green Benedict test) allowed before each dose of insulin. It is most difficult to determine the correct dose in these cases, and the blood sugar must be estimated more frequently at midday, to make certain that the dose of insulin is adequate. The urine passed in the period 4—6 hours after the morning insulin should be tested, to make certain that the urine is free from sugar at some time of the day.

The threshold of the kidney is usually set at 180 mg. (capillary blood), but may be either raised or lowered. If it is raised, as is often the case in elderly people, and in long-standing cases of diabetes, the blood sugar may be between 200 and 300 mg. per 100 c.cm., even though no glycosuria occurs at any time of the day. Estimations of the blood sugar must be made more frequently in this type of case. If the threshold is lowered the patient will pass sugar, although the blood sugar is normal, or so low that the patient suffers from hypoglycæmia. The occurrence of glycosuria at a time when the patient suffers from hypoglycæmia does not necessarily mean that the threshold is lowered. Thus the blood sugar immediately after breakfast may be over 200 mg. per 100 c.cm., but have decreased below 180 mg. by 11 a.m.; the urine passed at this time will contain sugar. Between 11 and 1 p.m. the blood sugar may decrease to 50 mg. per 100 c.cm. and the patient may suffer from hypoglycæmia; the urine passed between 11 and 1 will be free from sugar. If these two specimens of urine are mixed, as occurs when the urine is not passed between 9 a.m. and 1 p.m., the mixture will give a good reduction with Benedict's solution. This occurrence often mystifies patients who do not understand how glycosuria and hypoglycæmia can occur at the same time. Renal glycosuria in association with true diabetes is, fortunately, a rare complication, but when it does occur renders treatment very difficult. The treatment is best controlled by means of the blood sugar estimations, as it is impossible to use the qualitative urine tests. The estimation of the total output of sugar on a day when the blood sugar is within normal limits is of assistance. The figure obtained is taken as a standard, and estimations of the total sugar made once a week or month. This will enable a check to be kept on the diabetic condition, and if the urine sugar rises the insulin should be increased.

When the blood sugar has been brought down to normal by insulin, on a diet consisting of C. 70 grams, P. 70 grams, F. 101 grams, Cals. 1,497, the future must be considered. Only a few years ago this amount of carbohydrate would have been considered large, while the fat would have been very low. Nowadays this diet is generally regarded as very low in carbohydrate, and by some workers as very high in fat. There is much discussion about the ideal amount of carbohydrate, and some workers give as much as 250 grams, provided that the fat is simultaneously reduced to 50 grams. If the patient objects to so little fat the carbohydrate must be reduced, and the fat increased. The experience of the last few years has shown that patients appreciate the more varied diet, and feel better and stronger with the higher carbohydrate diet; if they are taking insulin they may be able to reduce the dosage or leave it off altogether.

The amount of carbohydrate in the diet should be at least 100 grams, and if this amount cannot be tolerated insulin should be given. This will enable the carbohydrate to be increased to the optimal amount, which lies between 120 and 180 grams. If active work is being performed and if the patient is young, the carbohydrate should be increased up to 180 grams or more. It is better to increase the carbohydrate by 15 or 30 grams, dividing it between the three principal meals. The extra carbohydrate should be balanced with insulin and, as a rule, 1 unit of insulin will balance 4 grams of carbohydrate, so that 30 grams will require an addition of 8 units. This should be divided between the morning and evening doses. When the urine tests and, better still the blood tests show that the dose of insulin is correct, the additional carbohydrate should be given with the extra insulin. Unless the carbohydrate is increased above 180 grams it does not seem necessary to reduce the fat below 100 grams. This amount permits the patient to eat 1 oz. of bacon and 1 oz. of butter in the day. If the patient does not need this amount of fat, it should be decreased to 70 or 80 grams. The change in the balance of carbohydrate and fat enables the fat to be completely metabolized, and the acetone bodies should never be present in the urine. They are only found when the blood sugar is raised and are therefore a valuable danger sign.

An additional advantage of the high carbohydrate diet is that it allows of " buffer " meals. Some patients suffer considerably from hypoglycæmia when the attempt is made to keep the blood sugar within normal limits. This can be prevented by giving 10 or 15 grams of carbohydrate about 11 a.m. and about 10 p.m. This may necessitate a small increase in insulin, 2–4 units—but it often prevents the blood sugar changing so quickly from hyper- to hypo-glycæmia, and then back to hyperglycæmia.

The small amount of carbohydrate allowed at tea-time is often complained of by patients in this country. This restriction is necessary when patients have two doses of insulin, but not when they are taking one or three doses. The insulin injected at 8 a.m. is nearly exhausted at 4 p.m., and even a small amount of carbohydrate will often cause glycosuria by 7 p.m. It is occasionally necessary to give a third dose of insulin if the patient's work demands a good tea. One advantage of the high carbohydrate diet is that " diabetic foods " need not be ordered. The foods which contain the minimum of carbohydrate are unpalatable, while those which the patient likes contain nearly as much carbohydrate as ordinary bread. Many patients have done themselves harm by eating such foods under the impression that they contained no carbohydrate.

It is not easy to say whether the amount of food prescribed will be adequate, as it depends on whether the patient was a large or small eater. The best way of settling this point is to weigh the patient each week. If the patient either loses weight or does not regain the normal weight for his height, the food must be increased, and either the carbohydrate or the protein should be increased. For an adult a protein ration of ½ gram per lb. is usually sufficient, but it may be increased by 7 or 14 grams (28 to 56 calories) above this amount. The additional protein is best added as fish, as this contains least fat, but if meat is chosen the butter ration should be slightly reduced. It is better to increase the carbohydrate by 20 grams (80 calories) and increase the insulin by 5 units. If the patient is gaining weight too rapidly, the fat ration should be reduced by 10 grams or ⅓ oz. of butter (93 calories). If the patient gains weight in spite of this reduction, the protein should be reduced until the weight remains steady.

One advantage of the high carbohydrate diet is the influence it may have on arteriosclerosis. Some quite young diabetics have shown well marked atheroma of the aorta and large vessels, although no case of gangrene of a limb has been recorded. The cholesterol in the blood in these cases has been above the normal. The change in the diet has reduced the blood cholesterol to normal, and it is hoped that the atheromatous process may be arrested.

Time of urine testing.—It is most important that the patient should learn to test the urine, and should continue to do so although no sugar is excreted. The time at which the urine should be collected varies with the severity of the disease. If the patient has no insulin or only a small dose, the urine passed after the evening meal should be tested. If two doses are given, the urine should be tested before each dose of insulin. It is important to remind him that if sugar is present before the morning dose of insulin, the evening dose is too small, and if sugar is present before the evening insulin, the morning dose is too small. Even when a patient is doing very well the urine passed after breakfast may contain sugar, although no glycosuria occurs, at any other time. It is difficult to prevent this, but insulin 45 or even 60 minutes before breakfast may be successful.

PROGNOSIS

The prognosis depends on two main factors : (1) the care with which the patient arranges his diet, and (2) the other diseases which may develop. The practitioner cannot do more than teach and advise about the arrangement of the diet, but his treatment of the other diseases will largely determine whether the diabetes gets worse or not. Any disease, no matter how trivial, seems to cause an increase in the insulin needs, and unless more insulin is injected, sugar will reappear in the urine. It is important to increase the dose of insulin at once, and the patients should automatically increase the dose by 2 or 4 units for all minor infections. The chief difficulty arises when a patient feels ill, and is unable to take any food. His natural tendency is to take no insulin as he cannot take any carbohydrate, and this belief has been responsible for many patients dying in coma. The best way of determining the dose is by an estimation of the blood sugar but as this is often impossible the urine must be tested every three hours. If sugar is present, insulin must be given, and the dose must be repeated every six hours if the urine in the specimen four to six hours after the insulin contains sugar. Insulin should be withheld if this specimen is sugar free, until sugar reappears. The size of the dose depends on the amount of sugar in the urine, and the dose may have to be increased from 20 units in the day to over 100 units. The patient should understand that all other illnesses may make his disease worse, and that he should see his practitioner as soon as he feels ill.

RECENT VIEWS ON THE TREATMENT OF DISEASES OF THE LUNG AND PLEURA

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IF a review be made of contemporary medicine and the concepts of the present day compared with those put forward in a standard treatise, such as Clifford Allbutt and Rolleston's "System of Medicine," published some twenty-five years ago, it is a matter for a good deal of satisfaction to note the many advances which have been made during that period. In diseases of the lung and pleura the progress has been as great as in other fields of medicine; that in common with other branches the improvement in diagnosis has considerably outrun methods of treatment is no matter for surprise, for specific treatment must of necessity wait on accurate diagnosis.

PNEUMONIA

The treatment of pneumococcal pneumonia.—Two new methods of importance have recently been introduced and a third is an older method revived: (1) Felton concentrated serum. (2) Artificial pneumothorax. (3) Quinine therapy. Of these methods that of serum therapy appears to be the most rational.

A concentrated serum is available for Types I and II, which are responsible for the larger number of cases, about 60 per cent.; but there is not any serum available for Type III or the conglomerate Type IV. The serum is only effective if used within the first 72 hours of the onset of the disease, preferably in the first 48 hours.

Type I appears to be more effective than Type II, though disease caused by Type II is more frequently followed by cardiac infection and is of worse prognosis.

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Cecil in a collection of cases treated comparatively gives the following results: in 473 cases of Type I the mortality was reduced from 31·2 to 20·1 per cent., and in 505 cases of Type II, from 45·8 to 40·5 per cent. The sputum must be collected and typed for the invading organism; this can be done by rapid methods (Armstrong) either in four hours or by a direct method at once, though this is a laboratory rather than a bedside procedure. If the organism is found to be Type I or II, 20,000 units of the correct type are given intravenously (after testing for sensitivity); in less severe cases it is said that results may be obtained by intramuscular injection, but in this type of case serum is not so essential. If typing has not been done, 20,000 units of mixed I and II are given. Six to eight hours later if the temperature, pulse and respiration rate have not appreciably fallen the dose is repeated; if a fall has taken place 10,000 units may be given and in a further six or eight hours the dose may be repeated, increased or withheld. If a marked improvement is not obtained after the patient has received 120 to 160 thousand units a successful result is unlikely. In practice the patient often does not produce any sputum till the third or fourth day, in this event if the infection is thought to be pneumococcal 20,000 units of mixed serum may be given and repeated at six to eight hour intervals until a result is obtained, or the sputum has been typed. We have often seen treatment on these lines followed by recovery within 36 to 48 hours after the first injection and before any sputum has been produced. In very serious cases the initial dose of 20,000 units should be repeated in two hours, followed by a further injection four to six hours later. The principal objection to this treatment is the cost; 20,000 units costs £3, and £14–£20 worth may be used. If the pneumonia is streptococcal or Type III or IV the serum has been wasted. This position should be frankly put to the relatives. It must be stated that clinical types of pneumonia have altered a great deal and it is often impossible to be sure from clinical signs which organism is responsible.

Artificial pneumothorax in pneumonia.—Taylor[1] in 1931 described this procedure for pneumonia, which had previously been suggested by Wynn, and in 1932 Coglan reported six cases treated by this method. It should be started within the first 72 hours. 200–400 c.cm. of air are introduced into the pleura on the affected side; this may be followed by a rise of temperature, pulse and respiration rate, later a marked fall occurs, the improvement in the patient's comfort and general condition may be most striking, and the relief of pleuritic pain is a great advantage. If during the next 24 hours the temperature and pulse-respiration ratio rise, a further 200–600 c.cm. should be given, and may again need to be repeated. In our experience if marked improvement has not taken place with three injections, success is not to be expected. The number of cases suitable for this treatment is of necessity small, for in general it is better to use serum treatment. The rationale of the treatment is in some doubt, but it seems likely that as in a toxic case of pneumonic phthisis; the collapse of the blood vessels and lymphatics shuts the toxins off from the general circulation. In pneumonia the toxæmia is the danger rather than the consolidation which may be practically symptomless after the crisis. Acquaintance with the methods of artificial pneumothorax is obviously necessary. Collapse therapy in pneumonia is at present only in the experimental stage, but reports in the German literature speak very favourably.

Quinine has for many years been regarded as a specific for pneumonia of pneumococcal origin; it was used largely in South Africa in 1900 but was given up on account of the frequency of occurrence of toxic amblyopia; the preparation used, optochin hydrochloride, seems particularly toxic. By the use of optochin base these ill effects are avoided and for two or three years it has been in vogue again on the Continent and good results reported. Alternatively quinine hydrochloride or a large assortment of proprietary quinine preparations are available. Treatment should be commenced early, the method is as follows. Other medicines are avoided, 2–3 grains of optochin base are given followed by a little milk every four to six hours until the temperature falls or the general condition improves, if no improvement is present after the third day the drug should be discontinued. The dose must not exceed 15 grains per day or a total of 50 grains; in children the dose should be one quarter to half this. During treatment the patient should be on a full milk diet.

Post-operative pulmonary collapse and consecutive pneumonia.—At the present time the pulmonary collapse is regarded as the primary lesion; if this is not relieved, the collapsed lung becomes pneumonic due to the inflammatory changes, distal to the obstruction causing the collapse. The importance of correct treatment lies in the fact that pneumonia in a collapsed lobe is a long while in clearing up and in consequence is more likely to be followed by fibrosis or bronchiectasis.

Briefly the mechanism of collapse is the sum of several factors, the most important being: Blockage of bronchus by sticky mucus or aspirated material; limitation of respiratory movement; voluntary suppression of cough and tight bandages round thorax. Methods of treatment suggest themselves on this basis.

During anæsthesia great care must be taken to avoid aspiration of material, and after the operation measures should be taken to see that the patient breathes deeply. This may be attained by making the patient breathe a mixture of 5 per cent. CO_2—oxygen through a bag and mouth piece. The patient should be put to bed so that the side operated on is uppermost, and should not be discouraged from coughing, and sedatives to abolish cough reflex should not be given. Especially in avertin anæsthesia are precautions necessary, and the patient should not lie semiconscious in one position for hours. Coramine intravenously has been used to abolish the post-operative effect of avertin. If in spite of these precautions collapse occurs, two types of treatment are possible: (1) To make the patient breathe deeply and cough, or (2) to remove the plug of mucus. The first measure is easily carried out by making the patient inhale CO_2, and is most simply done by holding a glass funnel connected with a cylinder of pure CO_2 two inches from the nose and mouth; as a result respiration becomes deep in 30 to 60 seconds and the patient will tolerate the application for five or ten minutes without ill effect. This may be repeated for periods of 5 minutes at intervals of half to one hour according to the condition of the patient. An improvement of this method which we prefer is the use of the Haldane CO_2 and air apparatus made by Siebe Gorman, a determined percentage of CO_2 and air can be given for any length of time; better still is the CO_2 and oxygen apparatus, the disadvantages to this being its weight and that the cylinders only give a thirty minute flow.

Cough and evacuation of sticky secretion is promoted by this means and by the administration of potassium iodide and ammonium carbonate.

If these methods fail to produce improvement in 12–18 hours, removal of the obstruction by bronchoscopic suction must be considered; some advocate this procedure as soon as collapse is evident, but as it is distressing to an already discommoded patient the simpler method should first be tried.

The bronchoscopic method attacks the cause and we have had dramatic results in several cases treated in this way, but naturally the procedure is one for an expert in bronchoscopic methods.

Broncho-pneumonia and hypostatic pneumonia.—Modern opinion tends to emphasize the importance of atelectasis in the production of these conditions. Tracheo-bronchitis leads to bronchiolitis, occlusion of the small tubes and patchy atelectasis with inflammatory changes due to the infecting organism. For these conditions recourse should be had to the general methods for the prevention of collapse, stimulating expectorants, avoidance of sedatives and the inhalation of CO_2 to promote ventilation.

In collapse the pneumonic condition is secondary, whereas in this condition the collapse is secondary, therefore the results are not so striking.

Streptococcal and influenzal pneumonias.—It is often thought that sera are not of much use in these cases; our routine is to use mixed anti-scarlet and polyvalent streptococcal serum intravenously for the first dose and follow with polyvalent serum intramuscularly daily. We have had many evidences of its satisfactory action. We have sometimes seen apparently good results from the intravenous injection of hydrarg. perchlor. gr. 1/24, repeated the following day if necessary.

LUNG ABSCESS

Only one type of lung abscess lends itself to treatment by the practitioner, the simple acute idiopathic one with free drainage through a bronchus; ordinary medical treatment will cure these in about 60 per cent. of the cases. Differential diagnosis is mainly from purulent bronchitis, bronchiectasis with a flare up, or an empyema being coughed up. A febrile patient with signs of consolidation, cavitation or pleural effusion who on about the eighth to fourteenth day of the illness begins to spit up purulent or offensive sputum probably has an abscess. The bronchiectatic case will have a previous history, the empyema will not be spat up so soon. A suspected lung abscess should never be needled.

Treatment.—The treatment is that of any severe infection with special attention to the cardio-vascular system, cough is to be encouraged, expectorants and a creosote mask may be used. *Postural drainage* : This must be performed two or three times daily. It consists of keeping the patient flat on the bed with the diseased lung uppermost and the head over the edge of the bed, the foot of the bed is raised; in this position the patient must be encouraged to cough and to maintain the position as long as possible. This drainage is of paramount importance and must be strictly carried out; as the patient is very ill and the procedure entails considerable effort there is a tendency to omit it. No cough sedative must be given; as long as the cough is productive it must be encouraged, patient and nurse must be made to realize that cure depends on drainage of the pus from the cavity. If the sputum contains spirochaetes, intravenous N.A.B. 0·3 gram at weekly intervals should be given. Streptococci are responsible for most abscesses and antistreptococcal serum may be given. Emetine, quinine, iodine and other medicaments have been recommended; their value is open to doubt.

The measures mentioned above in a simple abscess with free drainage will lead to recovery in about 60 per cent. of cases in six to ten weeks; if after this time no improvement has taken place other methods must be considered. Though in general practice the acute abscess may be treated as above there is no doubt that better and more certain results are obtained if bronchoscopic drainage is instituted from the first; by this means the bronchus of drainage is kept open and the cavity disinfected, a cure is attained much more rapidly and was obtained in nearly all of our series of acute abscess which have been treated in this way. An acute abscess if not cured in two months must be considered as chronic; further treatment must not be delayed, and the case should be referred for specialist treatment. This consists of bronchoscopic drainage twice weekly, later once, and as the case improves, fortnightly; by this method some 50 to 60 per cent. of chronic lung abscesses will heal. If at the end of four months improvement has not taken place other methods must be considered. Artificial pneumothorax, phrenic evulsion and thoracoplasty have been advocated; in our opinion they are seldom of value and always dangerous. The two surgical methods are direct drainage if the abscess is accessible, and lobectomy. Because of the very serious prognosis and the liability of confusion with simple abscess, pulmonary gangrene must be mentioned. The signs and symptoms are similar, but the patient is more toxic and generally ill, the pyrexia is higher, the physical signs more diffuse and indefinite and the sputum more foul. The X-ray shows a diffuse shadow and not a clear cut abscess cavity or area of pneumonitis. Treatment is urgent and is surgical, but the prognosis is very grave.

BRONCHIECTASIS

Dry bronchiectasis requires no special treatment other than attention to the upper respiratory tract during infections of that area. *Dry hæmorrhagic bronchiectasis* requires only the above treatment and treatment for the hæmoptyses when they occur.

Bronchiectasis with sputum.—The first essential in every case of bronchiectasis is a bronchoscopic examination to exclude the presence of foreign body or bronchial obstruction. Further it must be remembered that many cases are secondary to infection from the upper respiratory tract. Medical treatment consists of expectorant mixtures, creosote mixture, chamber or mask, and postural drainage. By this means the patient may be kept in moderate health and comfort. Repeated bronchoscopic drainage and lavage is another palliative measure, the advantage over drainage lying in the fact that occluded bronchi may be dilated and antiseptic washes introduced. We have some 40 cases coming regularly to our clinic for this treatment.

Tidal drainage.—We suggest this term for the method of washing out basal secretion by displacing them upwards with a heavy fluid, lipiodol being the only one available. This treatment is in the scope of the practitioner; the lipiodol must never be introduced by the crico-thyroid route for fear of infection of the tissues of the neck, a very real danger. The posterior pharynx and larynx are painted with 20 per cent. cocaine hydrochlor. diluted with an equal quantity of adrenaline, i.e. a ten per cent. solution of cocaine; a nasal catheter is passed through the nose into the larynx by indirect laryngoscopy and the lipiodol injected with the patient leaning to the affected side. Antiseptic oils may be added to the lipiodol; our usual medicament for this procedure is 5 to 10 per cent. oil of gomenol. Cure can scarcely be expected, but the patient may thus lead a reasonable life. Surgical procedure, such as lobectomy, is only indicated if not more than one lobe is affected, a premise of which it is often difficult to be sure and which seldom obtains in an advanced case.

PLEURAL EFFUSIONS (SEROUS)

The tuberculous effusion usually requires no treatment except general hygiene. If, however, the effusion is so large as to cause much displacement of the heart, sufficient fluid must be aspirated to give relief. A decade ago it was fashionable to replace effusions with air. This is now done only when there is an active pulmonary lesion, the replacement being continued as an artificial pneumothorax.

EMPYEMA

This matter is important; many chronic empyemas seen are due to lack of appreciation of certain points. These are principally: (1) the condition of the underlying lung; (2) the infective organism causing it.

(1) Empyema may occur over new growth or abscess. In either case they may be opened without detriment to the patient. When, however, an empyema occurs over a pneumonic lung, open operation must not be considered until the lung has become air-containing again. Repeated aspiration daily, or less often, as the case may demand, is the right course to pursue. As the condition in the lung resolves, i.e. when the lung becomes expansile again, open operation is undertaken.

(2) The common types of infecting organism are pneumococcus, streptococcus and tubercle bacillus. The streptococcus produces a thin serous effusion and adhesions form late. If the chest is opened the lung collapses, if it has not already done so from the size of the effusion. With the absence of adhesions the lung has no help to expand again and a chronic empyema is produced, taking months to close even if thoracoplasty does not have to be undertaken as a last resort. Streptococcal empyemas, whether secondary to pneumonia or not, should be treated by repeated aspiration for 14 days to one month until it is probable that adhesions have formed. Closed suction-drainage under pressure may be employed. This treatment helps to expand the lung to the chest wall and cause attachment; occasionally the empyema may be cured by these methods, but the object is not so much to promote cure as to allow of resolution and

the formation of adhesions before open operation is undertaken.

Pneumococcal empyemas: The effusion is thick and adhesions form early, delay need not be so long before open drainage is resorted to; even in these cases aspiration for seven to twelve days is advisable before opening. In children under two years the need for delay is even greater and aspiration or suction drainage should be carried out for many days.

Tuberculous empyema and pyo-pneumothorax: In this condition it is most important to keep the empyema free from secondary infection with pyogenic organisms. In some tuberculous empyemas, particularly in A.P. cases, the patient suffers very little from the complication, the temperature is slight and the general condition remains good. In these cases we are of the opinion that it is best to leave the empyema alone and treat the patient on general lines. If high fever is present and the patient's general condition is suffering the first step should be repeated aspiration. For this purpose a trocar as small as is adequate should be used and some iodine injected along the needle track on withdrawal to prevent the formation of a sinus.

If simple aspiration fails it may be combined with saline, eusol or acriflavine solutions; if this again fails oleo-thorax or acriflavine-gelatino-thorax may be tried. As a last resort thoracoplasty or if secondary infection has taken place, open drainage followed by thoracoplasty.

SPONTANEOUS PNEUMOTHORAX

This may be either (1) valvular or (2) closed. In the former case increasing pressure may cause so much displacement and dyspnœa that life may be endangered. If no apparatus is at hand relief may be obtained immediately by puncturing with a large bore needle with the nozzle covered with sterile gauze. After this procedure to relieve the immediate urgency, pressure must be kept down by continuous release or suction and controlled by the manometer at frequent intervals.

In the closed type there is little distress and nothing need be done except to put the patient to rest. The collapse puts the lung in the best position for healing and removal of air with consequent expansion may cause a fresh rupture. The majority absorb in from one week to two months, in some cases it may become chronic and persist for months causing dyspnœa on exertion. These cases can be treated by the injection of mildly irritant fluids into the pleural cavity to promote effusion and adhesion or closure of the rupture by lymph, the hyperæmia produced may aid in the absorption of the air. The fluids we have used are 20 c.cm. of 5 per cent. glucose or double this if the first injection fails; alternatively 5 to 10 c.cm. of one per cent. silver nitrate.

HÆMOPTYSIS

This is a complication which the practitioner is frequently called upon to treat. While bleeding is present attention must be directed to the urgent symptoms and the underlying cause must wait for investigation and treatment at a later date. The commonest causes of hæmoptysis are pulmonary tuberculosis (early and late), bronchiectasis, broncholiths, neoplasm, acute infections including abscess, mitral stenosis, infarcts and aneurysm.

The blood, from whatever source, is voided by way of the bronchi, and two points call for consideration: First, the means to stop the bleeding, secondly, the evacuation of the blood from the bronchi; if the blood is not evacuated it will coagulate in the bronchial tree and cause collapse of part of the lung, indeed we have seen collapse of the whole lung from this cause. Further, in the case of infection, as in tuberculosis or pyogenic disease, the aspirated blood will spread the infection to other parts of the lung. The natural method of evacuation is by cough and we are of the opinion that, apart from one or two exceptions mentioned below, it is a serious mistake to administer sedatives to the extent of abolishing the cough reflex.

In the case of advanced disease in which there is little hope of recovery the position is different, e.g. advanced tuberculosis with large rigid-walled cavities, aneurysm of the aorta leaking into the trachea, and advanced new growth. The patient must be put to bed on absolute rest; no physical examination in the way of percussion is legitimate—we have frequently seen hæmorrhage re-started in this way. Mental quiet is as essential as physical rest; no anxious relatives should be allowed around, the excitement caused to the patient by the hæmorrhage increases the blood pressure and the general circulatory flow; mental calm must be attained by reassuring the patient and the administration of sedative drugs, such as bromide and chloral, sufficient to allay anxiety without causing drowsiness. Ice to suck, ice bag to chest, hæmostatic or horse serum, calcium chloride intravenously are routine measures. Adrenaline 1 to 5 c.cm. may be injected into the bronchial tree either through the crico-thyroid membrane or bronchoscopically in severe cases, especially in new growth or bronchiectasis. We have found a one per cent. solution of congo red, 5 to 10 c.cm., given slowly intravenously to be a satisfactory hæmostatic.

In pulmonary tuberculosis, if the hæmorrhage is not controlled by the above-mentioned methods, an artificial pneumothorax should be induced. In early cases with few signs (in which the hæmorrhage is not likely to be so severe) and in advanced cases with bilateral signs it may be difficult to decide from which side the blood is coming; if radiological help is not obtainable the patient is usually able to indicate correctly the side from which the blood is coming; in some cases there may be an area of hyperæsthesia over the nerve segment corresponding to the site of the bleeding. If owing to adhesions an A.P. cannot be obtained on the side from which the blood is coming a contra-lateral A.P. may stop the hæmorrhage. Occasionally an emergency phrenic evulsion may have to be considered. In those patients with tuberculosis who have recurrent hæmorrhage either A.P. phrenic evulsion or thoracoplasty must be considered.

NEOPLASMS OF THE LUNG

Undoubtedly this condition is becoming very much more common, and unfortunately in this branch diagnosis has not advanced as far as it has done in other diseases of the lungs, and treatment is equally behindhand. It is seldom that a case is diagnosed early enough for any treatment to offer a real chance of cure. This is usually rather the misfortune of the patient than any lack of skill on the part of the practitioner as the disease is frequently symptomless until it is fairly far advanced.

The treatments which are at our disposal are intrabronchial introduction of radium, deep X-ray and radium bomb therapy, and lobectomy. The first three, except in exceptionally early cases of bronchial carcinoma of centrifugal type, can only be considered as palliative measures and offer very little hope of a cure. Nevertheless the introduction of radium or radon into the bronchus may be particularly useful in the following manner. Often the most distressing symptoms of pulmonary neoplasm are caused by suppuration taking place behind a bronchus which has become obstructed by growth. Radium introduced into the bronchus will reduce the size of the neoplasm, allow free air-entry and drainage and materially improve the condition of the patient. We have treated patients in this way for more than a year and the air way has been kept patent. Extension none the less continues into the surrounding areas.

In the intra-bronchial type of growth, if the disease be diagnosed early enough and it is distant to the upper-lobe bronchus, which is but seldom the case, lobectomy may offer some chance of cure. On this account it is important to stress the means we have of diagnosis of this condition in the early stages. The first pathological manifestation of the disease is a small papule or erosion arising usually in the main stem bronchus; the only means of diagnosis is by bronchoscopic examination and this gives a definite finding which can usually be confirmed by section. The only symptoms at this stage are an irritating cough and occasionally hæmoptysis, and either of these symptoms arising suddenly in a patient past middle life, especially if of the male sex, should arouse suspicion and the patient should be subjected to a bronchoscopic examination. This is the stage, if the growth be distal enough, in which lobectomy may give a good chance of eradication. In the next stage, collapse of a lobe or part of a lobe from intra-bronchial obstruction, the diagnosis may be suspected by the physical signs of collapse and a lipiodol "hold up" in the radiogram at the site of the obstruction; but bronchoscopic examination is essential to confirm the diagnosis. At this stage it is very doubtful if lobectomy will offer any chance of cure. In this case the only treatment is X-ray or radium bomb. We have had many cases treated by deep therapy, but our experience has been that there is a marked tendency to dissemination and that the patient is often worse after treatment. Possibly modifications in technique may render this treatment more hopeful, but at present we seldom recommend it.

Reference

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ARTIFICIAL PNEUMOTHORAX

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SPONTANEOUS pneumothorax must be regarded as a serious complication of pulmonary tuberculosis because in most cases the tear in the visceral pleura does not heal and a pyopneumothorax results. In some cases, however, a dramatic improvement has followed its occurrence and for this reason as long ago as 1822, James Carson, F.R.S., of Liverpool, suggested that the disease might be treated by the induction of pneumothorax artificially. Although this procedure was carried out in a few cases it was not until some twenty years ago that it became really recognized in this country as a legitimate method of treatment. It has, however, been practised for over fifty years on the Continent, notably by Forlanini in Italy and later by Saugman in Denmark. Artificial pneumothorax treatment can now be obtained not only in the big towns, but even in small outlying districts in almost every country of the world, and the best testimony to its value is the fact that it is one of the few methods of treatment for pulmonary tuberculosis which has stood the test of time. This is not surprising because the great principle in the treatment of tuberculosis is rest of the diseased part, and pneumothorax is nothing more than a method of resting the affected lung.

ARTIFICIAL PNEUMOTHORAX AND THE GENERAL PRACTITIONER

It often happens that a patient who has had a pneumothorax induced in a hospital or sanatorium returns home and finds that his family doctor is unable to carry on the treatment. It is true that it is almost always possible to get the necessary refills at a local hospital or tuberculosis dispensary, but this tends to give the patient the impression that his own doctor does not understand his disease, whereas no one is better fitted to advise as to his mode of life and to conduct the general treatment than his own general practitioner. Artificial pneumothorax may and often does actually save the patient's life, but after all it is only a method of resting the diseased lung, and in order to obtain the best rest I cannot emphasize too strongly the necessity of medical attention quite apart from the giving of refills.

Discussion of this matter with many general practitioners reveals an almost universal opinion to the effect that it is not worth while to undertake the treatment in ordinary general practice. Some few living in districts where likely cases are apt to stay are prepared to give refills and I have known one or two doctors come to the hospital for a course of instruction. A practitioner, formerly house physician at Brompton, told me that he is occasionally asked to give a refill to a patient visiting his district, but that he has never had a suitable case for artificial pneumothorax in his own practice and is never likely to have one. He also said that if another local practitioner had a pneumothorax case and could not conduct the treatment, the patient would be sent to the tuberculosis officer or to a consultant and not to him or any other doctor practising in the same district, and that from a business point of view the knowledge of pneumothorax treatment which he obtained at Brompton was not of any practical value to him. The majority apparently feel that they are not likely to get more than one or two cases in a lifetime and that, although there is no difficulty whatever in giving the actual refills, the details of the treatment and its complications are by no means so simple. Not only are X-ray examinations needed from time to time, but frequent visits to a consultant would probably be required to discuss such problems as intrapleural pressure, the correct dosage and spacing of refills, when to stop them and the treatment of effusion, adhesions or other complications. Some feel that if the practitioner gave refills he would get all the blame if things went wrong, whereas in a successful case the credit would go to the consultant.

I think the practice of charging so much for each refill is a mistake and that a patient should pay an agreed fee for pneumothorax treatment just as he does for thoracoplasty and not so much for each stitch. Of course one could not arrange one fee for the whole treatment because one patient might have to stop after a few weeks, whereas another might have his pneumothorax maintained for several years, but it would be better to arrange a quarterly or half-yearly fee for conducting and managing the pneumothorax regardless of the actual number of refills. If this were done the patient would regard the physician performing the treatment as he would a surgeon conducting an operation and would keep under the care of the general practitioner even if he did not give the actual refills. I have always felt, however, that it would be much better if the practitioner gave the refills himself and used the tuberculosis officer or consultant for an opinion from time to time as need arose. If the doctor had no experience of artificial pneumothorax it might be necessary for him to have frequent consultations with the physician, but it would at least keep the patient in touch with his own practitioner. I sympathize with the view that it would not be worth while for the busy practitioner to master the details of such a treatment especially as he will probably never come across a case requiring it in his practice, but I think he should be prepared to give the actual refills.

I have described[1] the technique of artificial pneumothorax, the possible complications, and the method of dealing with them, and in this article I must confine myself to a consideration of the possibilities offered by the treatment and the indications for its use.

INDICATIONS IN PULMONARY TUBERCULOSIS

(1) *The acute or exudative type of disease.*—The more the fibrous formation the less the indication for pneumothorax and the more the indication for thoracoplasty. In the early acute case with pyrexia and sputum containing tubercle bacilli pneumothorax is urgently needed if the disease is unilateral.

(2) *The subacute type.*—Acute cases are rare and most patients when first seen give a history of gradual failing health, usually with cough and often some symptoms such as hæmoptysis or pleurisy, and there may or may not have been some rise of evening temperature. In such a case most physicians would advise a good trial of simple routine treatment before inducing pheumothorax and there is no doubt that by this means a great many patients recover. At the same time a fair proportion do badly or relapse after an initial improvement and if pneumothorax is then advised its value is apt to be impaired by adhesions or areas of adherent pleura. If, therefore, when first seen there is sputum containing tubercle bacilli and the case is sufficiently advanced for constant crepitations to be heard over the affected portion of lung or a definite lesion can be seen by X-ray in one lung, the other being free of disease, it is usually wise to induce a pneumothorax at once.

(3) *The chronic type.*—Here pneumothorax is not so often indicated and rarely produces the dramatic improvement seen in the early acute case. An acute exacerbation in old disease is sometimes benefited by pneumothorax and it may be of value in the chronic case with cavities. Owing to adhesions or adherent pleura good collapse is not often obtained in the chronic case, but under modern methods of adhesion cutting it is sometimes possible to collapse cavities or get a satisfactory collapse of the lung in cases which

at first appear quite hopeless. Even if a full collapse is obtained it is quite common to find bronchiectatic cavities with fibrosis and subsequent secondary infection when the lung eventually is allowed to re-expand in these chronic cases and many of them eventually come to thoracoplasty. The more the fibrosis the more likely thoracoplasty and the less likely pneumothorax is to do good.

(4) *Children.*—When the so-called adult type of tuberculosis occurs in children, pneumothorax should be done at once if the case is unilateral.

(5) *Circumstances.*—If a patient has to work or lead an active life or cannot afford prolonged rest he is safer with a collapsed lung.

(6) *Hæmoptysis.*—Pneumothorax is the only rational method of treating hæmoptysis and should be induced if the bleeding is severe or continued.

(7) *Pregnancy.*—Pneumothorax lessens the risks of an exacerbation after parturition in a tuberculous subject, but its possibilities should not be allowed to affect the indications for inducing abortion which is usually a much safer procedure if done within the first four months.

(8) *Complications.*—Tuberculous laryngitis or toxæmia often improve after pneumothorax.

(9) *Tuberculous pleural effusion.*—In these cases the liquid should be aspirated and a pneumothorax induced if the underlying lung has active disease, but it should not be done as a routine in pleural effusion.

CONTRA-INDICATIONS

(1) *The early case.*—It has been said that an artificial pneumothorax should not be induced until simple medical means have been tried and, broadly speaking, I agree with this view. I regard it as wrong to induce a pneumothorax in every unilateral case as soon as a diagnosis is made, but one must remember that the disease often spreads rapidly and a pneumothorax

has been induced too late far more often than too early. Whether or not it should be done in an early case depends on the acuteness of the disease rather than on the length of history.

(2) *Bilateral disease.*—Here again the activity in the better lung is more important than the amount of disease. Unilateral pneumothorax leaves the disease in the other lung untreated and so is treatment for only part of the disease. If there is much toxæmia collapse of the worse lung may lead to improvement, but with active disease it often results in a rapid spread in the untreated lung. Bilateral pneumothorax does not often give good results although a temporary improvement may occur and occasionally it may lead to dramatic improvement even in a bad case. It may be indicated when an active lesion develops in the untreated lung during artificial pneumothorax and in this case it is often better to allow the treated lung to re-expand before collapsing the other. If there is bilateral disease when the patient is first seen a partial pneumothorax may be induced on both sides simultaneously or one lung may be collapsed and a partial collapse of the other started later. A full collapse of the lung is always better than a partial one and the chief reason why bilateral pneumothorax is so disappointing when compared with the striking results in unilateral cases is that full collapse is impossible. I have found it better in most bilateral cases to obtain as good a collapse of one lung as possible and to treat the other with sanocrysin. At the same time the patient should be given a long period of rest in bed. Small doses of sanocrysin may be successful, but I have obtained definitely better results when the dose has been raised to at least 0·75 gram. If possible I like to start with 0·1 gram and if there is no reaction give 0·25, 0·5, 0·75 and 1 gram at weekly intervals and to repeat the last dose three times so that the total given is 5·6 grams and the course lasts

seven weeks. If there is a reaction I do not increase the dose at the next injection, and in the case of a small delicate patient I make 0·5 or even 0·25 the maximum dose, and the total sanocrysin given in any one course not more than 4·5 grams. If a rash appears the treatment should be stopped as a serious desquamative dermatitis may appear even with a small dose. I have never seen any serious complications except dermatitis and do not think they are likely provided a week is left between the injections and not more than 1 gram is given at any one dose or 6 grams at one course. Good results from very small doses have been recorded, but my experience coincides with Secher's[2] that many failures are due to using too small a dosage.

(3) *The advanced case.*—Pneumothorax should not be induced in a hopeless case as it may make the patient's end more uncomfortable. When there is much fibrosis it is rarely indicated.

(4) *Temperament.*—In every method of treatment this is important. Very neurotic patients are bad subjects for pneumothorax and I had to stop the treatment in one case because the patient had such a dread of the refills. In many nervous patients, however, the psychological effect of pneumothorax is good, especially in an institution where they see so many others successfully treated that they are actually disappointed if unsuitable for it themselves.

(5) *Age.*—This is not important in itself, but as age advances the more fibrotic the lesions tend to be and consequently the less suitable for pneumothorax. I have known a patient of over 70 do very well with an artificial pneumothorax.

Apart from tuberculosis artificial pneumothorax has been induced :—(1) To relieve the pain in pleurisy. (2) For purposes of diagnosis, either to determine whether a tumour shown by radiography is extra- or intra-pulmonary or to allow a thoracoscope to be introduced into the pleural cavity. (3) As a preliminary to certain surgical procedures, for example, lobectomy. (4) In recurrent hæmoptysis of unknown origin. Most of these cases turn out to be tuberculous, but some are due to fibrosis of lung or dry bronchiectasis. (5) For certain cases of bronchiectasis. In the majority of these cases, however, adhesions prevent a sufficient collapse of the lung. (6) For abscess of lung. In these cases there is a risk of rupture of the abscess into the pneumothorax cavity so that many authorities consider it too dangerous a method of treatment. At the same time artificial pneumothorax in certain types of abscess is effective and any other treatment is dangerous in this serious condition. I quite agree, however, that pneumothorax should be induced in only a few exceptional cases of abscess. (7) For pneumonia. Successful cases have been described, but it is not a recognized method of treatment in this disease and its value is rather doubtful. Apparently it does not, as one might expect, increase the risk of empyema which would be a pyothorax and more serious than if localized by adherent pleura as is the case with an ordinary empyema.

From this account it will be seen that the possibilities of pneumothorax are many, and I hope the time will soon come when at least one member of every medical firm will be prepared to give refills even if it is not feasible for him to gain enough experience in artificial pneumothorax treatment to conduct a case without frequent advice as to its details. In any health resort where there are many tuberculous visitors there is undoubtedly an opening for any practitioner who is thoroughly acquainted with the technique of the treatment.

References

[1] Burrell, L. S. T.: "Artificial Pneumothorax." London: William Heinemann (Medical Books), 1932.

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THE MODERN TREATMENT OF DISEASES OF THE HEART

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IT is impossible in the short space of one article to deal with every phase of treatment in diseases of the heart. Infections of the heart have therefore been excluded from consideration, and attention has been focused upon the central problem of cardiac failure and its treatment. The views expressed regarding the sequence of events in cardiac failure are based upon work which has not yet been published. They are submitted since they seem to fit the observed facts.

The fundamental result of structural disease of the heart is that the circulation is slowed. The heart muscle, its efficiency impaired, is unable to drive the blood round at the normal speed. Some of the slighter forms of heart disease, such as mild degrees of mitral stenosis and regurgitation, are not incompatible with a normal circulation speed. The patient will then be free from cardiac symptoms. Others, too, may have a little slowing and yet be able to live normal lives. This applies to many cases of aortic regurgitation and hyperpiesia, and to some with myocardial lesions.

When the slowing has reached the stage that the blood is travelling at about two-thirds of the normal speed, there will be symptoms of cardiac failure on exertion; these are dyspnœa and angina pectoris.

DYSPNŒA

Dyspnœa is the common symptom of cardiac failure. It may appear suddenly when it is usually due to the onset of an abnormal rhythm. The patient should then be examined for signs of venous engorgement. Dyspnœa may come on gradually owing to a progressive deterioration in the cardiac efficiency. Of itself it does not require any treatment, but it should be regarded as a sign, warning the patient that he must limit his activities or lessen in some way the load upon his heart. Thus an obese cardiac patient will be able to do more if he will conform to a diet directed to reduce his weight. In cases in which it is doubtful if dyspnœa is of cardiac origin, a full cardiological examination is required to ascertain if the heart is responsible.

Nocturnal dyspnœa.—Attacks of dyspnœa may occur which wake the patient at night; they are associated with high blood-pressure or aortic regurgitation when the left ventricle is particularly exposed to stress. These attacks are of all grades of severity ranging from a little difficulty in breathing, which may be accompanied by some wheezing, to the distressing attacks of so-called pulmonary œdema. The treatment of the more severe forms will be considered under venous congestion. For the minor attacks rest is required; the heart has been overtaxed during the day and the patient must do less. Some opiate should be given at night; adrenaline may give relief but it cannot be depended upon. The prognosis of those in whom these attacks recur is not good, and there is no reason why morphine should be withheld. As acidosis may be a factor the urine should be tested for ketone bodies, and glucose given if they are present.

ANGINA PECTORIS

The second symptom of cardiac failure is pain on exertion or effort angina. Since the syndrome of coronary thrombosis has been separated, it has become clear that there is a large group of patients who experience the pain only on exertion, or when excited. In them also the speed of the circulation is slowed, and to the same extent as in those who have dyspnœa. Effort angina may thus be regarded as an alternative symptom of cardiac failure to dyspnœa. It probably falls to the lot of those in whom the heart muscle becomes short of oxygen before the other muscles of the body. It is thus particularly prone to occur when there is disease of the coronary arteries.

Many patients with angina soon learn how far they can go without bringing on the pain, and so regulate their own lives. In others, however, the attacks increase in frequency and may occur daily notwithstanding all the precautions that the patient may observe. It almost seems as if in these cases the heart becomes hypersensitive to whatever stimulus produces the pain, since the attacks can usually be abolished by means of a strict regime. All exertion, every source of worry and irritation should be eliminated. It is not necessary to confine the patient to bed, but he should not be allowed to walk upstairs or out of the house; and, as he must not attempt to attend to his business, he is better away from home. Useful adjuncts at this stage are light soothing massage and effervescing carbonated baths, but the essential factor is the mental and physical rest. Lacarnol in doses of twenty drops a day has proved helpful. Under this regime the patient may confidently expect to become free from attacks. Difficulty may be experienced with irritable patients in whom the blood pressure is apt to rise on any small emotion, and who may have attacks while physically at rest, but with a co-operative patient success may be anticipated. Freedom from attack for a fortnight should be achieved before the next stage is commenced. Massage is now invaluable and should aim at strengthening the muscles of the legs and back before walking is allowed. Walking should commence on the level and then on gentle slopes, and so the patient gradually resumes as much of his former activities as the condition of his heart will allow; how far he will reach it is impossible to predict, but often a useful life can be led. The more intelligent the patient the better will be the result.

VENOUS CONGESTIVE FAILURE

The signs of heart failure are engorgement of the veins in the neck, enlargement with tenderness of the liver, and œdema. The first two of these are due to congestion of the veins, and when they are found venous congestive failure is present. In terms of the slowing of the circulation venous engorgement has a variable onset. It does not occur until the circulation has slowed a little beyond the point of onset of dyspnœa, but only about half of such cases have clinical signs of congestion. Venous engorgement seems to arise when there has been a sudden deterioration in the cardiac efficiency in those whose circulation is already slowed. The most frequent cause is the onset of auricular fibrillation in a chronic rheumatic heart. Other patients may persist in exertion in spite of dyspnœa; in them the immediate cause of the congestion is probably a dilatation of the heart. Those suffering from angina pectoris do not get venous congestion since the pain stops the exertion at once, and the heart is thereby protected.

Engorgement of the venous system is due to an over-running of the heart by the circulating blood. The circulation has been proceeding at a slow speed and the cardiac reserve is exhausted, when the heart suddenly becomes less efficient. It cannot therefore transmit the blood which is returning to it. The blood is held up behind the heart and must collect in the veins. Venous congestive failure may thus in a sense be said to be a back-pressure phenomenon, though the term is better avoided owing to its association in the past with leaking valves. Since there is much more blood in the systemic circulation than in the pulmonary, the engorgement will affect mainly the great veins and the liver. Sometimes, however, the left ventricle fails alone, and an acute congestion of the pulmonary system results. The patient then experiences an attack of " acute pulmonary œdema."

Treatment.—The treatment of venous congestion is rest in bed and adequate doses of digitalis. The circulation is no longer proceeding freely, and it must be readjusted. This may be effected by allowing the heart to work under the easiest conditions possible, and by strengthening the force of its contractions. *Rest:* The patient should be confined absolutely to bed; he should be in the position of greatest ease, and this usually means that he will need to be propped up with a cardiac rest behind the pillows. It is essential that he should sleep, and morphine may be used for this purpose without hesitation, if it is required. *Digestive system:* In urgent cases with vomiting, no more than glucose drinks may be tolerated, but otherwise milk may be given. Brandy is useful to control restlessness and make the patient feel more comfortable. In less urgent cases fish may be allowed. The bowels should be opened initially with calomel, and kept open with cascara or any other suitable laxative. A bed-pan is necessary.

Venesection: The overloading of the veins can be relieved directly by removing half to one pint of blood; occasionally more may be taken with advantage. This can be done either by piercing the vein with a lancet or by means of a French's needle. The pressure in the great veins is thus reduced, and the load upon the right side of the heart diminished. After a successful venesection, percussion to the right of the sternum will frequently show that the right border has moved in one inch or more towards the mid-line, and this contraction has been confirmed by radiograms. Success in a venesection depends largely upon the rapidity with which the blood is withdrawn, and therefore the older, though cruder, method of slitting the vein is preferable. The guide as to the selection of suitable cases for venesection is to be found in the veins in the neck. When they remain distended with the patient sitting up, a venesection is urgently needed. If the engorgement is less pronounced, the condition of the heart should be taken into consideration. In those in whom the congestion has followed the onset of auricular fibrillation and whose apex rate is rapid, it will be safe to await the effect of digitalis, since the congestion will be likely to disappear as the rapid cardiac action is controlled. If the rhythm is normal, a moderate venesection of half a pint will usually be beneficial, but if the primary disease affects the left ventricle, such as in aortic regurgitation, venesection is apt to prove disappointing. A rapid improvement sets in, but, as the contractions of the right ventricle become stronger, the left has to do more work. In these circumstances it may fail completely and the patient may die suddenly the next day. *Leeches:* If the liver is much enlarged six leeches should be applied over the organ. It is not clear how they act, but the liver certainly diminishes in size, and the patient obtains much relief.

ŒDEMA

Whereas venous congestion has a variable onset in terms of the speed of the circulation, that of œdema is abrupt. It does not appear until the circulation has slowed to one-half of the normal speed. It seems to be due purely to the slowing of the blood-stream, the capillary walls probably becoming more permeable through lack of oxygen. Because it shows a more advanced stage of cardiac weakness the prognosis of œdema is worse than that of venous congestion. When œdema is also present the outlook is less favourable than if congestion is present alone. Unless it follows the onset of auricular fibrillation, when a great improvement may result from the control of the cardiac rate with digitalis, few patients survive the advent of œdema for more than two years.

In the treatment of cardiac œdema it is well to work according to a definite plan. If one remedy fails the next is applied. There are diuretics other than those given below which at times work well. It is not suggested that the following scheme should be adhered to rigidly; it must often be modified to suit the circumstances, but it may serve as a working model. The patient being in bed, with the fluid intake limited to thirty ounces in the day, digitalis is given in doses of not less than a drachm a day. With this treatment most cases will commence a diuresis within a week. Should the œdema persist one of the xanthine group of diuretics should be added to the digitalis. Calcium diuretin in doses of fifteen grains thrice daily is both safe and efficient. If no diuresis results within six days, salyrgan (1 c.cm.) is given intravenously. The diuresis following salyrgan is prompt, so that, unless it has occurred satisfactorily within twenty-four hours, ammonium chloride (gr. xx t.d.s.) is given by mouth, and the salyrgan repeated in doses of one or two c.cm. after three days. Finally it may be necessary to draw off the fluid by Southey's tubes or by multiple incisions down the shins. This procedure may start a diuresis which will remove the rest of the fluid. Though left until the last it should not be delayed too long, and if there is fluid in the pleural or peritoneal cavities it should be removed in the earlier stages as collections in these situations are apt to embarrass the action of the heart.

DIGITALIS

In the majority of cases the onset of venous engorgement follows the advent of auricular fibrillation, and this demands digitalis. The effective dose of digitalis depends upon the weight, and methods of giving massive doses of digitalis have been advocated, the calculated dosage being based upon the body weight. The following method requires no calculation and is generally satisfactory. If the weight of the patient is ten stone or less, and the severity of the symptoms is moderate only, a drachm of a reliable tincture is given at once. This is followed on the succeeding days by one drachm divided into three doses. Such a case would need to be seen once a day, and an effect might be expected in five or six days. If the patient weighs more than ten stone, a drachm and a half is given initially, and the same amount subsequently divided into three doses. In urgent cases half a drachm may be given every four hours. Such a case would need to be visited two or three times daily, and the full effect of digitalis might be expected in about two days. The drug is stopped when the cardiac rate at the apex has fallen below eighty, or if signs of digitalis intoxication ensue—coupled rhythm, nausea, or a diminution in the daily output of urine. A day or so after stopping the drug the pulse rate will rise slightly, and then holding doses must be commenced and continued indefinitely. They again vary with the weight of the patient, but are in the neighbourhood of half a drachm daily. When the rhythm is normal it is not so easy to assess the beneficial effect of digitalis. Watch must be kept for the occurrence of a diuresis or an improvement in the general condition. An average dose would be one drachm a day divided into three doses.

QUINIDINE

Quinidine is a valuable remedy, though with a limited application. It is a depressant to the heart, but on account of its action in prolonging the refractory period of the heart muscle it often stops the circus movement of auricular fibrillation and flutter. It may be employed in two ways: the first is to abolish paroxysms of auricular fibrillation, and it is then given in doses of ten or fifteen grains a day. These doses may be continued indefinitely if necessary. Any idiosyncrasy to the drug is tested by giving a small dose of three grains on the day before the larger doses. It is naturally better to know that the attacks are actually due to paroxysms of fibrillation before prescribing quinidine, but if the patient gives a characteristic history of them it is reasonable to try to establish the diagnosis by the response to treatment. Not every case will respond to quinidine, but sufficient do so to make it worth trying.

The second use of quinidine is to abolish an established fibrillation. The situation here is different, and it is doubtful if the attempt should ordinarily be made except after a complete cardio-vascular examination. Quinidine is dangerous in the presence of heart failure or of an active infection of the heart. If the lesion is that of mitral stenosis normal rhythm cannot be expected to last long. The most suitable cases are those without valve lesions, and in particular thyrotoxic cases in whom normal rhythm has not returned spontaneously after thyroidectomy. Regarding the manner of administration opinion varies as to the method of choice, but the following has proved satisfactory. A test dose of five grains for sensitivity is given and the pulse rate is taken one hour later. If it has not risen above 150, and the patient does not complain of headache or nausea, on the following day thirty grains divided into six doses are given at two hourly intervals. The pulse is charted hourly and a report is made if normal rhythm returns, or if the pulse rate rises above 150, or if nausea or headache be severe. If normal rhythm returns the quinidine is stopped for the day, unless a small amount only has been required when five more grains would be given at night. The pulse is often found to have become regular when the patient wakes next morning. If this has not occurred, the same quantity of quinidine is repeated on the second day, and then again on the third. If the case is still refractory, digitalis is substituted until the apex rate has been brought down to below 80. It is then stopped and quinidine repeated for another three days. If after the third course of three days the fibrillation persists the attempt to restore normal rhythm is given up, but more than two-thirds of all cases will respond at some time during the course. After the restoration of normal rhythm the patient should stay in bed a further week, and should then get up in gradually increasing amounts. During this time it is advisable to give ten or fifteen grains of quinidine a day as a holding dose. It should be continued until the patient is again living his ordinary life.

THE MODERN TREATMENT OF THE ANÆMIAS

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IT is absolutely essential that before any treatment is considered for an anæmic patient a correct diagnosis should be made as to the type and cause of the anæmia; the former usually offers little difficulty but the latter may be less obvious. The importance of this lies in the fact that once treatment has been instituted further attempts at diagnosis may be completely obscured. For correct diagnosis it is necessary to make a complete clinical examination of the patient, followed at least by a full blood count and a fractional gastric analysis. The former, of course, is essential since anæmia is commonly associated with so many diseases, especially neoplasms, gynæcological or other pathological conditions, and pregnancy. In these cases attention will obviously be turned to the primary cause, and secondly to the correction of the anæmic state. In many patients, however, a primary cause may not be found and the anæmia becomes the first consideration. Fortunately more than 90 per cent. of the cases of anæmia met with in general practice fall into two large groups, for which satisfactory treatment is now available and can be readily carried out at home. In the more rare blood conditions the special advantages of institutional treatment should be considered.

It will be convenient in discussing treatment to use a classification, though not perfect, based upon current ætiological views and methods of treatment. In this way treatment of the vast bulk of the anæmic states becomes a relatively simple procedure. Anæmia (as applied here to a deficiency of red blood cells and/or hæmoglobin) may be due to: (*a*) acute or chronic blood *loss* as may occur post-operatively or associated with menorrhagia, etc.; (*b*) excessive blood *destruction*, as in the acute and chronic hæmolytic anæmias and familial acholuric jaundice; (*c*) *destruction* or complete *inhibition* of the blood-forming organs (and mechanism) as in aplastic anæmia; (*d*) defective *functional activity* of the blood-forming (hæmopoietic) system. The anæmias in the last group appear to be of the nature of deficiency anæmias since they are associated with a deficiency in either (*i*) the supply, formation or absorption of the anti-anæmic principle (as found, for example, in liver) or (*ii*) the supply, absorption or utilization of iron.

Treatment of group *a* consists in relieving the primary cause and administering therapy as in group *d* (ii) below; group *b* includes the rarer anæmias that are usually difficult to treat satisfactorily in the patient's home; special treatment is necessary according to the particular condition, the diagnosis of which may offer some difficulties; in group *c* patients with the rarer and fatal aplastic anæmias are enabled to live a little longer by repeated blood transfusions which, however, do not act in any way as a cure. Group *d* comprises the great majority of anæmic patients encountered in practice. The type of deficiency determines not only the character of the anæmia, but also the required treatment. (i) Anæmia of the type of pernicious anæmia (macrocytic hyperchromic anæmia) occurs when there is a deficiency in the supply of the anti-pernicious anæmia principle (as present in liver) to the blood-forming tissues. An adequate supply of this substance in the body is dependent upon the presence of hæmopoietin (an enzyme in the normal gastric secretion), the correct qualitative food intake, and a satisfactory alimentary absorption of the digestion products of these two; consequently, an anæmia resembling pernicious anæmia may be found occasionally in association with pyloric or chronic intestinal obstruction or stenosis, starvation, hæmolytic or "pernicious" anæmia of pregnancy, sprue and occasionally together with or following gastro-intestinal cancer, operation (gastrectomy or gastro-enterostomy) or intestinal parasites. The anæmia in these cases usually shows a satisfactory response to adequate replacement therapy.

The important feature to bear in mind is that these anæmias appear to be true deficiency anæmias and require an adequate supply of the specific anti-anæmic principle of liver or stomach in order to maintain health. On the other hand, the anæmias in the second and larger sub-group (*ii*)—due in the main to a deficiency in the supply or assimilation of iron—do not respond to such therapy, but require adequate and massive iron therapy. This group contains the microcytic hypochromic anæmias, such as chlorosis (in male and female), simple achlorhydric anæmia, the Plummer-Vinson syndrome of dysphagia with anæmia, and the microcytic anæmias obviously secondary to pregnancy, cancer, gastro-intestinal operation (gastrectomy, gastro-enterostomy), nutritional anæmias of infancy, starvation. For purposes of treatment the anæmias of group *a* may also be included in this group.

From these remarks it will be appreciated that the great majority of anæmic patients seen in general practice have either a macrocytic hyperchromic anæmia (with high colour index) or a microcytic hypochromic anæmia (with low colour index); the first group requires the anti-anæmic principle as found in liver or stomach, while the second requires iron.

TREATMENT OF MACROCYTIC HYPERCHROMIC ANÆMIAS

The successful treatment of the anæmias in this group (i.e. usually uncomplicated pernicious anæmia, or less commonly pernicious anæmia of pregnancy) depends entirely upon the three following important factors : (*a*) the use of an active anti-anæmic preparation ; (*b*) a full and adequate dosage ; (*c*) a palatable and cheap preparation. The anti-anæmic preparations used are mainly fresh, uncooked liver or stomach, or their extracts, administered orally, while liver extracts are now available for administration by the intramuscular route.

Liver.—Fresh raw liver is still used by some, but the dose required in most cases is at least ½ to 1 lb. or more daily. This for most patients is both impossible and nauseating, and hence insufficient amounts are consumed with inevitably unsatisfactory results. A large number of more palatable liver extracts for oral use are available, but being very expensive, an insufficient dosage is consequently taken. Since some activity is lost in manufacture it is important to bear in mind that if it is desired to administer liver extract in place of ½ lb. fresh liver, then the extract derived from about 10 oz. should be given. It is usually necessary to administer the hydrochloric acid and pepsin mixture (*see* below) with liver therapy, since the latter does not entirely relieve the gastro-intestinal symptoms. There is no doubt at all that for the treatment of pernicious anæmia the use of fresh liver or oral liver extracts does not give as good results as those obtained with stomach preparations or parenteral liver extracts and is even less satisfactory when the spinal cord is involved.

Stomach.—The value of stomach in the treatment of pernicious anæmia, and " pernicious " anæmia of pregnancy, especially when combined degeneration of the cord is also present, has now been amply demonstrated in many hundreds of cases. The fresh, uncooked stomach may be given in 4-oz. doses daily, but as this is unpalatable to many patients active desiccated preparations, such as " pepsac," may be employed with advantage. The initial dose should be not less than 1 oz. (approximately three tablespoonfuls), and this full dose should be maintained until the blood count has returned to normal or, if cord changes are present, when these nervous symptoms have gone.

When the blood count reaches, and has maintained, a count of 4·75–5·75 millions red blood-cells with hæmoglobin values of 90–110 per cent., and there are no signs or symptoms of spinal cord involvement, then the dose can be safely reduced gradually (controlling the progress by regular blood counts), but it is wise to maintain a small regular dose indefinitely according to the requirements of the particular individual. It is possible to discontinue treatment in some cases for short variable periods, but very careful control should be kept on the blood condition. If the red blood-cell count falls below 4·25 millions, treatment should be immediately recommenced or the dose of stomach increased, especially when infections or complications arise owing to the rapidity with which these cases relapse once they start on the down-grade; the ever-threatening possibility of subacute combined degeneration of the cord will not permit of undue liberties in treatment. It is important to realize that even slight infections, such as colds and septic processes, will have profound effects on the blood condition; at such times the dose of whatever anti-anæmic preparation is being used should be increased to the full amounts temporarily.

Desiccated hog's stomach is readily administered in a variety of ways to suit the patient's palate, always provided that heat is carefully avoided, since the stomach active principle is very sensitive to such form of treatment. Most patients prefer to take it mixed in water (flavoured with condiments if desired), milk, port, burgundy, *cold* beef extract or soup and other *cold* drinks, or else mixed with butter, potted meat, sardines and similar foods. The response to adequate treatment with an active product is very characteristic. In the course of seven to twelve days the reticulocytes in the circulating blood will have shown a rapid increase in numbers, reaching a peak or crisis of 30 to 70 per cent., according to the initial level of the red cell count—the lower the initial count the greater the peak. From this time onwards the blood count begins to rise rapidly, although the patient will have shown and felt marked improvement often days before this is noted.

Intramuscular and intravenous liver therapy.—It occasionally happens that a patient with pernicious anæmia may refuse to take oral therapy, the gastro-intestinal symptoms, such as vomiting and diarrhœa, may be considerable, or the condition may be so severe and the blood count so low that more urgent treatment is necessary. Excellent results can then be obtained by the use of a suitably chosen liver extract prepared for intramuscular or intravenous injection, and it is abundantly clear that this method is far superior and safer than even blood transfusion, especially when the red cell count is much below 1,000,000 per c.mm. Since these preparations are likely to be used upon extremely ill patients it is absolutely essential that only such products should be used that are guaranteed by the manufacturers to have been *clinically tested* and shown to be active in the treatment of pernicious anæmia. This is of extreme importance, since so many of these products are quite useless, while price is no indication of value. (The equivalence of these products in terms of fresh liver varies with the different makes : thus, in two English preparations, 1 c.cm. of extract has been made from 10 grams (preparation A) and 20 grams (preparation B), respectively, of fresh liver, but their actual potencies are so great that clinically they give better results than many kilograms of fresh liver or its equivalence in liver extract orally.) The dose to be employed, of course, varies with the particular brand, but considering preparation A referred to above, which is guaranteed to be clinically potent, I find that the following gives extremely satisfactory results.

According to the severity of the condition, 4–8 c.cm. (representing 40–80 grams of fresh liver) are given on the first day, and 4 c.cm. on each of the second and third days. If the case is one of pernicious anæmia and there are no septic or infectious complications, the patient will begin to respond within two or three days, and the blood count will show extremely rapid increases in the red cell count and hæmoglobin percentage. Of course, even quicker improvement can be produced by slightly increasing the above doses. In most cases of pernicious anæmia the blood will return practically to a normal level without further treatment. Control by means of regular weekly or fortnightly blood counts in the beginning enables a careful check to be kept on the progress—as soon as the red cell count shows signs of flagging a further 2–4 c.cm. of the intramuscular preparation should be given. It will be found that when a normal blood count has been reached the injections will be less frequently required, but here again the necessary dose and frequency depend upon and varies with each individual and, amongst other things, the season of the year. In many cases I find that about 2 c.cm. every two to six weeks sufficient. Since this treatment must be continued indefinitely, a more satisfactory method may be to give the initial treatment as above and then as soon as possible commence the administration of say ½ oz. of pepsac, gradually increasing to 1 oz. as the patient improves under the influence of the intramuscular liver; the latter then being discontinued, the patient continues with an adequate maintenance dose of this desiccated stomach preparation. Under this regime extraordinarily good results have been obtained, while the cord changes have benefited most satisfactorily.

Cost and potency.—The cost of these different forms of treatment shows enormous variations. Thus, fresh liver in daily doses of 8–16 oz. (and the latter may be inadequate) will cost 8d. to 1s. 10d. per day, while fresh stomach in equivalent dosage only costs ½d. to 1d. Liver extracts are far more expensive, and in sufficient dosage (bearing in mind that it has to be continued indefinitely—probably for life) may require a daily expenditure of 1s. 8d. to 6s. 5d. Preparations of stomach also show enormous variations between 8d. and 4s. 10d. for a dose of 1 oz. daily. Price is no criterion of anti-anæmic potency, and fortunately most of the cheapest preparations are more active than many of the most expensive ones. It is important to realize that not only is the hog's stomach treatment much more efficient than oral liver or liver extracts, especially when cord changes are present, but a consideration of the above figures show that it is infinitely cheaper. For example, it is easily possible to keep the majority of the patients in normal health on maintenance doses of less than 3·5–7·0 grams of pepsac costing less than 2d. per day, whereas the full daily initial does of 1 oz. only costs 8½d., as against from three to nine times that amount daily if liver extracts are used. It is possible that the intramuscular liver preparations may be even cheaper, but it is too early as yet to be certain of this. This should have an important bearing on the cost of treating panel patients.

Of greater importance than the cost are the hæmopoietic potencies of the preparations used. It is important to realize that these various anti-anæmic products vary enormously in clinical value; the only way to test them is by specially controlled tests on selected cases of pernicious anæmia under observation in hospital, and consequently many preparations are being offered for use without previous trial as to their actual hæmopoietic potencies; thus it is possible that cases considered to be resistant to treatment have really not been given any anti-anæmic principle at all. The more chemical manipulation that takes place in their manufacture the greater is the destruction of the active anti-anæmic principle, so that, whereas active stomach and liver products are readily made, parenteral liver preparations are not so easy. In the latter case, therefore, every batch should be clinically tested. Until such time as all preparations are controlled it will be wise to use only such products as are guaranteed to be hæmopoietically active after clinical trial on each batch before issue.

The use of hydrochloric acid.—Sore tongue, vomiting, nausea, indigestion, flatulence, and diarrhœa are some of the commonest and most distressing symptoms occuring in pernicious anæmia, and frequently in other anæmias. As the blood picture of the patient improves with treatment, these are often very much relieved, but there is a marked tendency for the flatulence and indigestion to persist when liver is employed—while it may even increase the symptoms in some cases. Rapid relief is readily obtained by the use of the following mixture :—

℞ Acid. hydrochlor. dil. - - - - ʒss
Syrup. aurant. - - - - - q.s.
Glycerin. pepsini (B.P., 1914) ad - - ℥ii

Ft. mist.

Sig. : One to two teaspoonfuls in a tumbler of water to be taken with each meal.

This, however, is usually unnecessary when active stomach therapy is used, on account of its strong peptic activity and acid reaction.

TREATMENT OF MICROCYTIC HYPOCHROMIC ANÆMIAS

In this group the main deficiency is iron. This is frequently accompanied by achlorhydria gastrica. Satisfactory treatment here requires a full mixed dietary, to which must be added massive doses of iron in a suitably active form. A very large number of iron preparations have been employed, many of which are quite useless. The best and quickest results are undoubtedly obtained by using ferrous salts. Unfortunately they do not keep very well and are rapidly oxidized to the less active ferric salts. The most convenient preparations are: (*i*) ferrous carbonate or chloride, the former in the form of Blaud's pills, which must be freshly made and are better given crushed up immediately before use; the effective dose of Blaud's pills is 15–25 grains three times daily; (*ii*) a scale preparation, such as ferric ammonium citrate, given in a mixture, but this has the rather larger minimal effective dosage of 25–30 grains three times per day. No ill-effects arise from the use of even much larger doses of these products and, contrary to the usual belief that constipation ensues, one finds that the bowels become more regular and less troublesome. It is essential that these massive doses should be used for it is a frequent experience that insufficient iron is prescribed with negative results. Of course, the required amounts will vary in different patients, but usually it is a waste of time, material and money to give less than 45 grains of Blaud's pills or 60 grains of ferric ammonium citrate daily in the early stages.

There appear to be no contra-indications to this form of treatment, even when dealing with patients suffering from the microcytic anæmias of pregnancy, and excellent results follow the administration of large doses of iron. On the other hand, iron preparations for parenteral injection are unsafe to use, since the minimal toxic dose is only slightly greater than the therapeutic one. From time to time suggestions have been made as to the value of copper, manganese, liver and marmite in treatment, but there is no satisfactory clinical evidence that they serve any useful purpose in these microcytic types of human anæmias. In some cases it may be necessary to repeat a short course of treatment on the full dosage of iron from time to time, but the necessity for this will be indicated by the periodical blood counts that will be carried out.

Thus, it will be seen that the broad outlines of treatment of these deficiency anæmias are relatively simple once the diagnosis has been made, but it must be realized that there are borderline or transitional cases where the character of the anæmia may change from a microcytic to a macrocytic type or *vice versa.* The treatment then consists in a careful adjustment, according to the type of anæmia at the time—a simple procedure if carried out in conjunction with regular blood counts.

GENERAL TREATMENT

It is important that along with the above specific treatments certain general principles should be followed. Thus, complete *rest* in bed is necessary in the early stages, since the heart is usually in a weakened, fatty state. Although the patient may feel much better after a few weeks' treatment the cardiac condition will manifestly be unable to tolerate a sudden return to normal bodily activity, as will be obvious by the persistence of dyspnœa and palpitation, even with a rapidly improving blood count. A *full mixed dietary* is a necessary adjunct to treatment and is of special importance since starvation has an adverse and retarding influence. The avoidance of *complications* and *sepsis* is of prime importance and vigorous measures must be taken to combat them. Other drugs have been suggested for treatment, but they are best omitted unless there is a definite indication for them, e.g. thyroid gland for any coincident hypothyroidism. There is no justification for *splenectomy* or the use of *arsenic* in the treatment of these deficiency anæmias.

Blood transfusion is definitely contra-indicated in many cases and unnecessary in the remainder if adequate treatment on the above lines is carried out.

SCHEME FOR TREATMENT OF DEFICIENCY ANÆMIAS

(1) Correct diagnosis of the type of anæmia before treatment is commenced.

(2) Complete rest.

(3) Removal of cause if found.

(4) In addition to the general treatment vigorous specific treatment as follows:—

MACROCYTIC HYPERCHROMIC ANÆMIA (e.g. PERNICIOUS ANÆMIA)

First day, initial dose of intramuscular liver 6–8 c.cm.*

Second and third days, doses of 4 c.cm. each.

Fourth day onwards, continue treatment with " pepsac " orally (1 oz. daily).

When blood count has remained at normal and there are no cord symptoms, reduce dose slowly to the necessary adequate maintenance dose (varies with each individual).

If cord changes are present, the 1-oz. dose must be continued without reduction.

Increase to full dose of pepsac if infections, influenza, or colds develop.

MICROCYTIC HYPOCHROMIC ANÆMIA

If no dysphagia present give the following: Pil. ferri. carb. (Blaud's pills) gr. xx, three times daily (ferrous chloride in capsules, or ferric ammonium citrate in a mixture may be substituted).

When the blood count is normal again reduce the dose to a quarter. If blood count still maintained in the following months treatment can be discontinued.

When dysphagia is present give: Pil. ferri. carb. (as above) crushed up before use, or, better still, ferric ammonium citrate (not less than gr. xxx, three times daily) in a mixture.

If relapse occurs, repeat course of treatment as above.

In both cases hydrochloric acid and pepsin is a valuable adjunct since achlorhydria and gastro-intestinal symptoms are very common in these anæmias.

If the nature of the anæmia changes then treatment must also be changed accordingly along the above lines.

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* The dose will depend upon the particular brand of intramuscular liver used. The dose given here is for preparation A, described above, in which 1 c.cm. has been derived from 10 grams of fresh mammalian liver.

MODERN METHODS IN THE TREATMENT OF NEPHRITIS

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AMONG recent additions to the treatment of nephritis the chief have been modifications in diet, the use of large doses of alkalies, certain new diuretics, and methods for reducing intracranial tension in some of the acute cerebral attacks. But advances have also been made in that some of the older views have been shown to be without foundation and so no longer obscure treatment.

DIET

Three important advances in the dietetic treatment of nephritis have been made in recent years: (1) severe fluid and food restriction in acute glomerulo-nephritis, as advocated by Volhard; (2) the use of salt restricted diets in œdema; and (3) high protein diets which were introduced by Epstein for chronic nephrosis with œdema.

(1) *Fluid and protein restriction in acute nephritis.*—There has been an almost complete change in the dietetic management of acute nephritis. When it was thought that mechanical obstruction in the renal tubules by casts and debris was responsible for oliguria the object of treatment was to produce diuresis by giving considerable amounts of fluid. Milk was generally used as it provided both fluid and food, so that the basis of the diet was usually 3 or 4 pints of milk daily. There are several important objections to this line of treatment. In acute glomerulo-nephritis the capillary loops in the tufts are almost completely ischæmic[1],[2]. It is improbable that diuresis can occur from such glomeruli and in practice fluids only produce a diuresis later when the glomeruli are healing. A free

fluid intake during the early stages therefore only increases œdema and may sometimes embarrass the heart because of hydræmia[3]. Another objection to milk is that it is rich in salt (1·6 gm. per litre) and protein (30 gm. per litre) both of which are retained during the acute stage when renal function is impaired. For these reasons the administration of fluids, and especially milk, seems no longer to be a rational line of treatment. If the kidney is to be spared as far as possible and retention of waste products and fluid prevented, protein and salt must be largely prohibited and water intake should not be greater than the urinary output. Caloric needs can be largely disregarded for the short time that these restrictions need to be enforced, but they can be supplied to some extent by carbohydrate and fat which are completely oxidized in the body.

Volhard[4] has advocated the strictest adherence to this principle of saving the kidney from work. For three to five days only a little weak tea or lemonade or half an orange two or three times a day is allowed. Volhard claims that patients bear the hunger and thirst well, and neither he, Lichtwitz[5] nor Fishberg[6] found any ill effects. It is claimed that this rigorous diet not only rests the kidney but also diminishes œdema and hydræmia, lowers blood pressure and seems to prevent convulsions. The strict regime should not be continued for more than five days as a rule, but by then there is generally improvement with a spontaneous diuresis. Subsequently the diet is increased gradually by adding cooked fruit, sugar, candy, cooked vegetables and rice, butter, cream, etc. In a week or ten days sufficient protein may often be given as milk, eggs, bread, chicken or fish, to maintain nitrogen equilibrium.

There is no doubt that abstinence is a sound principle in the early treatment of acute nephritis. Its objections are mainly practical for it leads sometimes to troublesome thirst and may be difficult to enforce particularly in general practice. It should not be attempted in previously debilitated subjects.

(2) *Salt restriction in œdema.*—The need for salt restriction in nephritis with œdema became apparent from the investigations of Widal [7, 8] and Strauss [9] some thirty years ago. They showed that the excretion of sodium chloride was much impaired in œdematous patients and that salt added to the diet increased this œdema. When the salt was reduced to a minimum œdema often diminished. Since then the use of salt restriction has become general but there are certain points that deserve special emphasis. A diet absolutely freed from salt cannot be attained in practice. Most people take 10 grams or even more daily, and if œdematous patients are restricted to about 2 grams a day no appreciable fluid retention is likely to result. Most raw foods are poor in salt, but milk, cheese, salted butter and fish, preserved meats and bread are notable exceptions and therefore should be avoided. McLester[10] states that only 2 to 4 grams of sodium chloride are taken daily if no salt is added to the food in cooking or at table and if salty foods are excluded. More severe salt restriction can be obtained by using salt free bread, and Allen[11] has even advocated a diet which reduces the urinary chloride excretion to less than 0·5 gram daily. Such severe salt restriction makes the diet unpalatable and the appetite may be completely lost. This can be prevented to some extent by choosing the food carefully, and flavouring with such things as onions, vinegar, mustard, pepper or nutmeg. Prolonged and severe salt restriction sometimes leads to vomiting, headache and pains in the legs though these symptoms may be rapidly relieved by giving as little as 2 grams of salt.[11]

(3) *High protein diets in chronic nephrosis.*—It is now recognized that restriction of protein is often harmful in chronic nephrosis. Loss of protein in the

urine is sometimes very great, amounting to as much as 20 or 30 grams a day. This decreases the amount present in the plasma which is an important factor in producing œdema. Moreover protein restriction in such a protracted disease is harmful because of other general effects. For these reasons Epstein[12] introduced high protein diets for the treatment of nephrosis. Patients regain strength, become less anæmic and lose their œdema sometimes even completely. They retain the increased protein within certain limits[13] even though the amount in the plasma may not always be increased[14], [15]. Reduction of œdema may be due to a rise in plasma protein as Epstein believed, but it has also been thought to be due to the large amounts of urea which are formed in the body from the protein taken.

High protein diets should not be given when renal activity is impaired. This must be investigated beforehand, and the specific gravity of the urine watched carefully during treatment. Epstein's original diet was made up of protein 120 to 240 grams, fat 20 to 40 grams and carbohydrate 150 to 300 grams, giving an energy value of 1250 to 2500 calories daily. Up to 1500 c.cm. of fluid was allowed and sufficient salt to make the food palatable. Such a diet is composed mainly of lean meats, whites of eggs, skimmed milk, gelatin, beans, peas, lentils, rice and oatmeal. Though there is little fat in this diet it may be increased with advantage. Peters and Bulger[13] find that a liberal supply of both fat and carbohydrate so reduces the protein used that a daily ration of about 100 grams provides an ample surplus over the amount catabolized together with that lost in the urine.

ALKALIES

Large doses of alkalies have been used recently both in the prevention and treatment of nephritis. Osman[16] found that the incidence of acute nephritis as a complication of scarlet fever was reduced by their prophylactic administration. He used a standard mixture containing 15 gr. each of sodium bicarbonate and potassium citrate; sufficient was given to keep the urine about the neutral point. Osman[17],[18] has also shown that large doses of alkalies are often beneficial when there is œdema, especially in chronic nephritis in its various stages. Œdema and albuminuria are not infrequently lessened or may even disappear. Potassium citrate and sodium bicarbonate are given by mouth in doses from 180 grains up to 1,000 grains daily until the urine is alkaline with a p^H of 7·0 to 7·6. They sometimes need to be continued for months or even years or else the œdema returns. In very chronic cases diet restriction is not so important with this intensive alkali treatment. But the risk of overdosage is considerable and the treatment requires much care. Generally speaking, it should be used only under expert control and preferably when estimations of plasma bicarbonate can be done. Tetany, vomiting and diarrhœa are the commonest symptoms of overdosage.

Intensive administration of alkalies for short periods is a valuable palliative measure for the relief of uræmic dyspnœa and restlessness. Both these symptoms are due to acidosis[19],[20],[21] and are often better relieved by alkalies than by morphine[22], though, of course, only for a time unless renal function improves. One or two drachms of sodium bicarbonate should be given every hour until there is relief. In an emergency it may be given intravenously as a 4 per cent. solution.

DIURETICS

Therapeutic improvement of kidney function in nephritis is limited for two reasons : A large part of the renal parenchyma is often grossly injured or destroyed, and there is no effective means of stimulating the failing kidney by a direct action on its cells. In acute nephritis the saline and purine diuretics are almost always useless. Mercurial diuretics are dangerous because of the risk of poisoning. Nevertheless, diuretics are sometimes of great help in the treatment of nephritis. For instance, in chronic nephritis renal failure is often precipitated by cardiac failure. The patient may have warded off uræmia by a polyuria which has allowed a total excretion of waste products sufficient to prevent a steadily mounting retention. When heart failure supervenes this compensatory mechanism is lost. Treatment of the heart failure by rest in bed and full doses of digitalis is the best means of restoring renal action. In this type of patient mercurial diuretics are often beneficial.

Diuretics are also useful in some cases of chronic nephrosis with œdema, but most of the older ones are unsatisfactory. Urea given in doses of 300 to 600 grains daily for three to seven days sometimes leads to a profound diuresis, but it is uncertain and causes intense thirst. Potassium salts may also be effective as they are excreted by the kidney even when sodium chloride is retained[23]. They are useful chiefly when there is no impairment of renal excretion. Thirty or forty grains of potassium acetate may be given four or five times a day. Drugs like ammonium chloride or nitrate which increase the blood urea and cause acidosis[24] are often powerful diuretics in such patients[25], though they are ineffective when there is renal insufficiency and are then to be avoided. They are chiefly of value in nephrosis or œdema due to heart failure. Large doses such as 120 to 180 grains may be given daily in divided doses, if necessary for long periods. As such doses tend to produce gastric irritation they may have to be given in keratin coated capsules.

Large doses of calcium chloride, which also produce acidosis[27], have been successful in the treatment of nephritic[28] and cardiac œdema[29]. Blum and his colleagues[30] have maintained that calcium chloride is the least harmful and most efficient diuretic in nephritis with œdema. They used doses up to 160 grains daily together with a diet poor in salt. The same diuresis may also be obtained by using injections of parathyroid extract. McCann[31] gave an initial dose of 10 to 20 units of parathormone and repeated this at intervals of a week or so. Urgent symptoms of over-dosage are not likely to follow such doses but it is advisable to control their effect by serum calcium determination; if this is impossible hypercalcæmia may be suspected if lethargy, irritability, vomiting and diarrhœa set in about six hours after an injection.

The greatest advance in the field of diuretics has been the introduction of certain organic compounds of mercury. The first of these was novasurol which was introduced as an antisyphilitic but was shown to be a powerful diuretic by Saxhl and Heilig[32]. Unfortunately novasurol sometimes proved to be extremely toxic and is now discarded. But two similar compounds, salyrgan and neptal, have since been introduced. Both are far less toxic than novasurol though equally powerful diuretics and have the advantage that they may be given intramuscularly as well as intravenously.

The main application of these drugs is in cardiac œdema but good results have also been obtained in chronic nephrosis. In œdema due to acute or chronic glomerulo-nephritis they should not be used because they fail to be excreted when renal function is impaired and mercurialism is likely to result. In suitable cases, however, their diuretic action is greater than any that can be obtained in other ways. It begins within two or three hours of injection and usually lasts about a day. During this time 85 per cent. of the mercury in the drug is excreted in the urine[33]. The diuresis from a single injection may be as great as 10 litres in a previously waterlogged patient. The usual dose for adults is 1 or 2 c.cm. repeated cautiously on alternate days until six to ten injections have been given. The best time to give the injections is in the early morning so that the action is largely over by night and sleep is not disturbed by the necessity of urinating. Keith, Barrier and Wheelan[26] thought that salyrgan was often more effective when ammonium chloride was given previously but this has not been the general experience. Alternatively it may be given along with large doses of urea by the mouth. Such combinations sometimes succeed when either diuretic alone has failed. Stomatitis, colitis, and hæmaturia are the commonest complications which may occur after any of these organic mercurial diuretics; but they are rarities after salyrgan and neptal provided that these are given only when renal function is comparatively good.

Bismuth salts have recently been shown to have a powerful diuretic action[34] when given by intramuscular injection. Bismuth sodium tartarate in doses of 0·03 gram is the best salt to use. Hanzlik found this to be more effective than novasurol, and there were no ill-effects except occasionally a local abscess at the site of injection.

REDUCTION OF INTRACRANIAL PRESSURE IN HYPERTENSIVE ENCEPHALOPATHY

The term uræmia was first used by Piorry[35] in 1847 for the intoxication which follows when the kidneys fail to purify the blood of waste products. Since then a number of different types of uræmia have been described and almost every symptom which may occur in Bright's disease has been ascribed to this cause at one time or another. There has often been no proof that these symptoms were due to defective renal function. Many investigations [4, 9, 36, 37] have made it clear that some of them are in fact due to other causes for they may occur when renal function is intact. This is the condition of pseudo-uræmic hypertensive encephalopathy.[38] It is most commonly met in acute glomerulo-nephritis and is characterized by acute cerebral symptoms, particularly headache, convulsions and coma. Severe attacks are clinically similar to lead encephalopathy and eclamptic seizures or may even resemble epilepsy. The blood urea and non-protein nitrogen may be normal or little raised and the serum calcium is not decreased as it is in true uræmic convulsions. It is believed that this condition is due to cerebral vaso-constriction[6], producing cerebral anæmia and often œdema from subsequent injury to the brain capillaries.[4]

On account of their different prognosis and treatment it is important to distinguish true uræmia from hypertensive encephalopathy. Uræmia is a herald of the end except in so far as the cause of the renal failure may be susceptible of healing as in mercurial necrosis, or be removable as in prostatic obstruction, whereas hypertensive encephalopathy has a decidedly better prognosis. For instance, there was complete recovery from most of the convulsive seizures of war nephritis, and this is true also of those occurring in other forms of acute glomerulo-nephritis. As the immediate causes of the two conditions are different their treatment aims at different ends. The main object in uræmia is to relieve the kidneys of as much burden as possible; in hypertensive encephalopathy a better cerebral circulation is the most important thing.

Lumbar puncture, the administration of intravenous salines, and venesection are the best means of giving relief. Intracranial tension is usually increased in these patients, especially if there is cerebral œdema. Even if the pressure is not raised lumbar puncture promotes a better vascular supply to the brain by increasing the available space within the rigid cranium. It should be done repeatedly for all severe attacks, and for their prevention when symptoms threaten. Sufficient cerebrospinal fluid should be removed slowly to reduce the pressure to normal. If the initial pressure is high it should be reduced in stages by successive taps at intervals of a few hours. Lumbar puncture often has a striking effect, but it fails sometimes.

Blackfan and Hamilton [39, 40] have recently used slow intravenous injections of 10 to 15 c.cm. of a 1 per cent. solution of magnesium sulphate per kilo body weight for the treatment of hypertensive encephalopathy in children. They obtained excellent results, 8 out of 11 cases recovering promptly from alarming symptoms. The injections may be repeated at intervals of twelve to twenty-four hours, and are supplemented by giving the salt also by mouth or rectally. Alternatively 40 c.cm. of a 30 per cent. solution of sodium chloride may be given intravenously.

It is not known why bleeding benefits hypertensive encephalopathy, though sometimes it will arrest repeated convulsions, and if done during the prodromal stage may prevent attacks and often relieve violent headache. Ten to twenty ounces should be removed in adults and 5 to 10 ounces in children. This is repeated if symptoms recur. Though infusion of saline or glucose solution has been advocated it may be dangerous because of heart failure or cerebral œdema. Rosenberg[41] reported convulsive seizures following immediately upon such infusions.

Nitrites which lower blood pressure and dilate arterioles including those of the brain might be thought to be of value. Fishberg[6] and others found no improvement from inhalations of amyl nitrite or from nitroglycerine by mouth. Nitrites raise the cerebrospinal fluid pressure even though the general blood-pressure falls[42] and perhaps this prevents a more rapid cerebral circulation in these patients. Nevertheless they are worth further trial, especially as an early measure before there is much cerebral œdema.

SHIBBOLETHS IN TREATMENT

Modern investigations have largely destroyed a number of former canons in the treatment of nephritis that had been held and taught for many generations. Restriction of protein, especially milk, in acute nephritis is one example that has been dealt with above (p. 421). Another important change of opinion concerns the form in which protein should be given, more especially in chronic nephritis. Formerly red meat was regarded as more harmful than white meat, fish, eggs, or milk, and was prohibited. This has never been supported by any satisfactory evidence and except that red meat is often less easily digested than white there is no reason why it should not be given. Red meat has been said to contain more extractives than white meat, but Strauss[43] and others have shown that the difference is negligible, and in any case it has never been proved that these are harmful to the kidney in the quantities present.

Formerly a routine treatment in uræmic patients was the promotion of vicarious excretion of waste products. It is now more generally recognised how little such excretion really helps to overcome nitrogen retention from renal failure. Von Leube[44] showed that a forced sweat only removed about 2 grams of nitrogen. Though as much as 2 to 3 grams of sodium chloride may be lost and fluid from a half to two litres it is usually difficult to make œdematous patients sweat profusely and attempts to do so may be dangerous because of collapse. These reasons have gradually led to the abandonment of forced sweating for the purpose for which it was formerly used. But some patients with renal insufficiency are probably improved by reflex vaso-dilation in the kidney. All the benefits of sweating can be obtained by milder measures than were formerly used, such as warm sponging or an electric light bath followed by wrapping in warm blankets.

Venesection is another measure which was long used with the object of removing toxic products. Probably it has little or no action of this kind[6] for in severe renal failure the amount of nitrogenous waste that can be removed even by a large venesection is negligible in relation to the total accumulated in the body. Venesection, however, is of great value in cardiac failure and should be used when this complicates uræmia. In the sudden cardiac failure of acute nephritis or coronary occlusion a timely venesection may save life.

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ADVANCES IN GYNÆCOLOGICAL TREATMENT

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A KNOWLEDGE first of physiology and then of pathology should be the scientific basis of treatment. As medicine slowly advances the proportion of rational treatment to empiricism gradually increases, though it must be confessed to that somewhat rare individual, the critically minded layman, that the empiricism of yesterday often becomes the rational therapy of to-day. We must perhaps further confess to the cynical layman that the value of the boasted scientific treatment, as judged by the end result of the cured patient, is often less obvious than that of the tried familiar remedies.

Medical "advances" therefore are not always regarded by an increasingly critical public with quite the same enthusiasm as their professional sponsors, whence the prosperity of a large body of practitioners outside the fold. When we ourselves sit down quietly, temper our enthusiasm, and calmly examine the actual results of new methods of treatment based upon additions to our scientific knowledge, we cannot but see that there is often a long step from the proved knowledge of physiology and pathology to its successful application in therapeutics. The chief reasons for practical failure following the advance in theory are first that all the facts of a great, deep, physiological complex are not known, witness the disappointment following our early knowledge of the defences of the blood and endocrine secretions, the technical difficulty of applying a new method, and neglect to realize that patients are not simply physiological machines.

THE SEX HORMONES

Advances in physiology and pathology are in general ahead of our capacity to apply them in therapeutics. An outstanding example is the new knowledge of the sex-hormone secretions. Here we have precise knowledge of certain substances, one at least of which can be produced in crystalline form, that are secreted by the ovary and pituitary body. We also know exactly what effects these hormones will produce when injected into laboratory animals, and yet the application of this knowledge to gynæcological treatment has proved disappointing. There appear to be two chief difficulties, both of which will probably be overcome. The first is that we assume too much when we expect to find the same simple cause-and-effect reaction in the mouse or rat reproduced in the human being, and secondly the technical difficulty of dosage probably prevents an obvious and beneficial reaction to treatment.

However, out of the enormous amount of new work done on the sex hormones, there have emerged some definite lines of treatment which not only promise much for the future, but already achieve results of real practical value. It may therefore be of interest to give a brief account of the methods of hormone treatment in gynæcology which give sufficient promise to justify trial and further clinical research.

The two main secretions of the ovary, " œstrin " from the Graafian follicles and stroma, and " progestin " from the corpus luteum, are mutually antagonistic. Œstrin, which can now be obtained in a crystalline form, causes œstrus or " heat " in the lower animals, and also a remarkable precocity in the development of the genital organs before puberty. As a treatment for sterility, œstrin has been unsuccessful, but some definite results have been obtained by injections of œstrin for periods of amenorrhœa following normal menstruation in young adults. It is useless for primary amenorrhœa of some years' standing, but is of value for merely delayed puberty. Sexual frigidity should find its specific in œstrin if the results of injections of ovariectomized and senile rodents could be applied directly to women, but so deeply is the purely mental factor involved in cases of frigidity that it is doubtful if œstrin injections would have effect. The results obtained by injection of senile animals with œstrin would lead us to expect a very potent treatment of menopausal symptoms, but so far the results are not well defined, and it is probable that no case of resumed menstruation has yet been noted. Some observers claim that the subjective symptoms of the menopause can be relieved, but again it is doubtful how far this is due to the true physiological action of œstrin. A practical difficulty in its use is that it is probably not absorbed when taken by the mouth, though this is disputed by certain manufacturers. It is probable, however, that a real reason for clinical failure lies in the inadequate dosage which is at present available for clinical work. Doses of 100 rat units (a R.U. is the smallest quantity which will produce œstrus in the ovariectomized rat) seem totally inadequate for an adult woman. Zuckerman finds that it is necessary to inject doses of 60,000 to 80,000 mouse units to obtain an œstrus effect in baboons, and on a weight-for-weight basis the amount for a woman should be nearly half a million units.

Considering, therefore, that œstrin is a potent physiological reality, it is certainly disappointing that clinical results are so difficult to obtain. It may be, however, that when much larger doses are available œstrin will be a valuable treatment for delayed puberty, secondary amenorrhœa, menopausal distress, and, perhaps, dysmenorrhœa, frigidity and sterility.

On theoretical considerations œstrin should have the power of stimulating uterine contractions during pregnancy provided that a sufficient dose can be given. The laboratory animals can be made to abort or pass into premature labour by œstrin injections.

No unequivocal success has yet attended attempts to empty the uterus of pregnant women. The writer has injected a woman 38 weeks pregnant with a dose of 500,000 R.U. of œstrin without any effect whatever, and we must conclude therefore that œstrin is of no use for induction of premature labour.

The corpus luteum produces a substance called progestin which has, generally speaking, effects opposite to those of œstrin. For example, it suppresses the maturation and rupture of Graafian follicles, thereby maintaining the animal temporarily sterile. After conception it stimulates the growth of the endometrium to form the decidua, and also can be said to prevent the non-pregnant uterus from menstruating. It is the dominant secretion of the ovary during the 10 days or so preceding menstruation, which only seems possible when, on or about the 26th day, the corpus luteum degenerates. If it is removed during the early weeks of pregnancy abortion usually, but not always, occurs. Per contra, treatment by corpus luteum can render the uterus quiescent, and so postpone labour beyond its normal date. A further activity of this substance is the part it plays in maintaining lactation. The corpus luteum is, in its turn, stimulated by a secretion of the anterior lobe of the pituitary body, and it is by this indirect method that attempts are made clinically to obtain the effects directly attributable to secretion of the corpus luteum. There is difficulty in isolating and preserving the secretion of the corpus luteum, and therefore the anterior lobe pituitary extract is used in its place.

More definite clinical results are obtained by this treatment than by the use of œstrin. Perhaps the most successful is the prevention of habitual and threatened abortion. There is sufficient evidence accumulated now by clinical observation to enable us to say that " antuitrin " is of real value. Women who have had a series of unaccountable abortions have carried successfully to full term if treated steadily through the early months of pregnancy. The method employed by the writer is to give 100 R.U. twice a week, beginning shortly after the first missed period, and continuing as long as the end of the fifth month. Occasionally, where the previous abortions have been comparatively late in pregnancy, the injections have been continued to the 34th week. Where abortion is threatened, as shown by a red discharge, it is useful to give 100 R.U. each day for several days while the patient is kept in bed.

Certain cases of functional menorrhagia in young adults yield to injection of "antuitrin" given a few days before and during menstruation. This is in accordance with what we should be led to expect from our knowledge of its inhibitory action on the uterus, and therefore it is possible if not probable that success here has a scientific sanction. Where other simpler methods such as rest and medicines have failed and no organic condition is present, it is well worth while to give the patient antuitrin for a few days before and during the period. Some gynæcologists have claimed striking cures of spasmodic dysmenorrhœa, but this has not been the experience of us all. The profuse and irregular hæmorrhages of the menopause are probably due to a disturbed endocrine co-ordination due to the atrophy of the ovary. It is reasonable to suppose therefore that antuitrin may check the bleeding, and its injection is certainly often followed by considerable improvement. These indications and results are set out with studied reservation, for I believe that the clinical future of the sex hormones will suffer seriously if extravagant claims are made during the initial experimental stages. There must be many failures so long as we know so little of dosage, co-ordination of the hormones, and the true clinical classification of symptoms on the basis of causal conditions.

RADIUM TREATMENT FOR MENORRHAGIA

There are certain cases of excessive monthly loss which can be cured by radium after the age of 40 or thereabouts. Screened radium, emitting the hard and penetrating gamma rays, acts both upon the ovaries and endometrium, in such a manner as to arrest menstruation, either temporarily or permanently, according to the dose used, the condition treated, and the age of the patient. Having ascertained that the patient is of suitable age, the essentials for successful treatment are a proper selection of the clinical conditions, and the dosage and screening of the radium. The most suitable condition is one in which there is no obvious local lesion to be found. Thus, there are no large fibroids, or inflammatory tubal swelling. The uterus may appear to be a little enlarged, suggesting a metritis (or metropathia) or a small unimportant fibroid may be felt. A fibroid polypus within the uterus will be a definite contra-indication to radium exposure, and, though it can seldom be diagnosed positively without opening the uterus, its absence may be assumed if the patient suffers only from excessive but fairly regular menstruation, and not from continual or very frequent hæmorrhage. The normal sized or uniformly enlarged uterus which menstruates excessively without other obvious physical signs, in a parous woman of 40 years or over, is the most suitable condition and a cure can usually be promised.

The dose and screening of radium are of great importance, for too small exposure is liable to make the patient worse, presumably by stimulating the ovary and causing a hyperæmic flush of the endometrium, while too large a dose is liable to cause a deep sloughing radium burn of the endometrium which will cause a foul discharge and the certainty, sooner or later, of a serious secondary hæmorrhage. For the arrest of menstruation at the menopause a dose of from 1800 to 2000 milligramme hours is sufficient, or 100 mgm. of radium element lying within the uterine cavity for 18 to 20 hours. At the age of 40 it would be advisable to use 2400 mgm. hours. Below the age of 40 larger doses are necessary to produce permanent amenorrhœa, and there are the risks of producing a permanent menopause in a young woman, or a burn of the endometrium, while too small a dose will actually increase the amount of bleeding. An advantage of radium over X-ray treatment, especially at or about the menopause, is the opportunity it offers to curette the uterus and thus exclude malignant disease. Radium for this form of treatment can be obtained conveniently in the form of radium emanation from the Radium Institute.

INFECTIONS OF THE CERVIX

Leucorrhœa due to cervicitis is one of the commonest gynæcological symptoms. In most cases it is a pyogenic catarrh causing a great increase in the amount of mucus secretion, and an actual increase in the amount of glandular mucous membrane. The electric cautery applied to an erosion around the os by light superficial touches is a quicker and surer method of destroying it than the application of chemical bodies such as iodised phenol, or silver nitrate. An efficient treatment of the cervical canal, from which comes most of the mucus discharge, is to pass the cautery wire as far up as possible, that is to the internal os, then turn on the current and draw it slowly down, pressing it into the mucous membrane. This can be repeated so as to make three or four " streaks " down the canal. Before passing the cautery clean out and dry the canal with liquor potassæ on a coated probe. A chronic " catarrh " of the vagina, producing a thick curdy discharge, is often difficult to cure. The curdy material consists chiefly of large masses of desquamated epithelium mixed with clumps of organisms. A useful method is to swab the vagina once with 2 per cent. silver nitrate solution, after which the patient should use a foaming pessary containing 5 per cent. lactic acid, or a douche containing 2 per cent. lactic acid.

PRURITUS VULVÆ

Where a definite cause can be found this can be treated with a fair hope that the irritation will disappear. But there are many cases of pruritus vulvæ, some of undoubted mental origin, where no cause can be found, which yield to none of the ordinary ointments or lotions. A temporary relief lasting for two or three months can be produced by the injection of "A.B.A." deeply under the skin around the vaginal orifice, or where the irritation is chiefly felt. A needle about 1½ inches long, attached to a record syringe which is charged with an ampoule of "A.B.A." is entered about ½ inch behind the vaginal orifice in the mid-line, and passed its whole length laterally along the vulva about ¼ inch deep to the inner surface of the labium majus. It is then gradually withdrawn while the fluid is slowly injected to empty the syringe. The same injection is made from the same puncture along the other side. It may be necessary to modify the seat of injection according to the site of the irritation. Also it may be advisable to carry the injection forward of the limit of the first injection described above to include the whole vulval area. It is important not to allow the fluid to be injected too close to the skin for fear of some superficial sloughing of skin. Though "A.B.A." does not cure the condition, yet it affords a long relief which enables septic scratches to heal up and the patient to gain much needed rest. Occasionally the unknown cause seems to disappear during the period of anæsthesia, and the patient is apparently cured.

THE USE OF GLYCERINE

Hobbs originally introduced glycerine injection into the uterus as a treatment for puerperal infections, but he later extended it as a treatment for utero-tubal infections and the hæmorrhage and pyrexia following septic abortions. Acute salpingitis must be regarded as a state of infection of both uterus and tubes, for there is direct mucosal continuity between them. In the milder cases, especially first attacks, associated with uterine hæmorrhage, glycerine may be injected into the uterine cavity through a gum elastic catheter about size No. 6, or Jacques rubber catheter. About 10 c.cm. may be slowly injected two or three times a day. If there is difficulty in introducing the catheter a smaller one should be used, for on no account must the cervix be dilated in the presence of an acute tubal infection lest adhesions be broken down by the pulling on the cervix. Should the injections produce a reaction such as rise of temperature or shivering they should be discontinued.

Another valuable use of glycerine is in the treatment of the septic endometritis of old women. There is always an obvious vaginitis present, but no amount of treatment of the vagina will clear it up or reduce the discharge if pus is being discharged either continuously or intermittently through the external os. The cervix is dilated with great care, having regard for the shortness of the uterine cavity and the frequent soft consistency of the muscle wall. A curette is then used very gently to ensure that no malignant disease of the corpus uteri is present. A small catheter should then be passed into the cavity and secured by a thin catgut stitch fixing it to the cervix. Through the catheter 10 c.cm. of glycerine are injected three times a day until the catheter drops out. The first injection may cause some pain, but after this there is usually no sensation. If the condition is a simple septic senile endometritis, not caused by carcinoma, the discharge will have ceased in about a week. Glycerine packing is also useful in simple vaginitis, though I confess that in many cases it is disappointing.

THE MODERN TREATMENT OF VENEREAL DISEASES

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FROM considerations of the space this article cannot do more than give a sketch of present-day methods of treating gonorrhœa, soft chancre and syphilis, and this, I fear, in rather a dogmatic way.

GONORRHŒA

It is often said that the modern treatment of gonorrhœa affords no better results than did that of twenty or thirty years ago; such a view is unwarranted. Certainly to the casual observer the average attack of gonorrhœa seems to last as long to-day as it did in earlier times, but if end-results are compared, the superiority of modern methods is obvious to anyone who has practised in this branch for more than twenty years. Formerly the determination of cure was very uncertain, depending mainly on the absence for a few days of visible discharge; now in good hands the patient is not dismissed as cured until prolonged observation with many bacteriological tests have failed to disclose gonococci. The treatment of chronic gonorrhœa was haphazard, and its cure was more a matter of good luck than good management; now the up-to-date worker proceeds on systematic lines to discover the cause of the chronicity and concentrates on that, with consequent shortening of the attack. Treatment methods were more violent, and the mucous membrane of the urogenital canal was often left in a permanently unhealthy condition; to-day the infrequency of urethral stricture as compared with earlier times testifies to the superiority of the milder, more rational, more precise and thorough treatment now practised by good workers.

Probably most of these would agree that the longer they have worked at the problem of evolving a sound treatment of gonorrhœa the more they have become convinced of the paramount importance of two principles to be observed, namely the maintenance of efficient drainage and the stimulation of an adequate resistance to the gonococcus. There is nothing new in the principle that efficient drainage is essential to the cure of a microbial infection, and its importance in gonorrhœa has been recognized for a number of years, though it still seems often to be overlooked by some who attempt to stem the flow of purulent discharge in the acute stages by applying strong astringents, and in the later stages, instead of searching for and concentrating their treatment on those parts of the urogenital tract where colonies of gonococci are more or less locked up below the surface, try blindly the passage of sounds, massage of the prostate, courses of vaccines and other methods they have read of as being good for chronic gonorrhœa, without any definite idea of what any of these things is doing for the particular patient. The importance of resistance has been recognized in a general way, but the difficulty has been to gauge it. For example, those who treat gonorrhœa rationally know that it does not pay to bludgeon the tissues with strong chemicals and that the patient must not do things which tend to lower his general fitness. It has often been noted, also, that such a complication as epididymitis or a peri-urethral abscess has brought an attack of gonorrhœa abruptly to an end, and it has been supposed that the complication must have generated such a large production of antibody as to annihilate the micro-organisms. But, except for the observation that the strength of the complement fixation reaction with a gonococcal antigen is commonly raised by a complication of gonorrhœa, it has not been generally recognized that this test is a practical gauge of the patient's resistance. D. Thomson, when working at the Military Hospital, Rochester Row, during the war, found that, coincidently with the clinical improvement of a refractory case under well-regulated vaccine treatment, the titre of the complement fixation reaction rose. More recently P. A. Clements, investigating at the V.D. Department, St. Thomas's Hospital, the effects of a special vaccine prepared by J. Oliver on the principles elaborated some years ago by Dimond, has confirmed this observation. He has found that in many intractable cases of gonorrhœa, cases mostly with a very slight discharge containing gonococci in which the disease has persisted for months in spite of careful treatment, the complement fixation reaction has been negative or only doubtful, and that when the administration of the special vaccine has been followed by a marked increase in the strength of the reaction to strongly positive, all symptoms and gonococci have disappeared; conversely, when the reaction has not increased in strength the disease has remained. Here it may be mentioned that I have often seen cases of chronic gonorrhœa with negative complement fixation reactions after courses of ordinary gonococcal vaccine, and see in this an explanation of the difference of opinion on the value of the vaccine treatment of gonorrhœa. The gonococcal complement fixation test shows that gonococcal vaccines differ considerably in antigenic power and also that patients differ in their response; a given vaccine may fail to raise the titre of the reaction in any case while another may fail in some but succeed in others. The value of the C.F.T. lies in the fact that, by it, one can judge much more quickly than by observation of clinical effects whether or not a vaccine is effecting its purpose. Again, in a number of cases studied in the investigation just mentioned it has been found that, when the complement fixation reaction was strong but the disease persisted, one could be practically certain that the sole requirement for cure was the discovery and treatment of badly draining foci.

The above general remarks may explain the following sketch of what I believe to be sound treatment of average cases of gonorrhœa. In acute gonorrhœa of males it is generally agreed in this country that there is little to be done at first besides washing the urethra twice daily with a mild lotion and that this is better done with an irrigator than with a syringe, provided that the irrigator is placed no higher than 3 to 3½ ft. above the urethra. Personally I believe in allowing the lotion to flow into the bladder as soon as the patient has acquired the knack of relaxing the compressor urethræ, but not in forcing the sphincter by using strong hydrostatic pressure; another condition is that only mild, comparatively non-irritating lotion is used. As to the nature of the lotion, potassium permanganate, 1 in 12,000 to 1 in 8,000, seems to be as useful as any and better than most for average cases, but, as changes, acriflavine (1 in 5,000), mercurochrome (1 in 2,000 to 1 in 1,000), mercury oxycyanide (1 in 8,000 to 1 in 4,000), protargol (1 in 1,000) and silver nitrate (1 in 20,000 to 1 in 10,000) may be found useful. With regard to general treatment, regular hours, mild, unspiced food, and abstinence from alcohol and spiced drinks are essential. Medicines are not really necessary in the majority of cases, but a sedative diuretic with belladonna in it seems to be useful in allaying spasm. With regard to vaccine treatment, I prefer now to wait until the symptoms have abated, regarding the vaccine as a mild spur to be used when the tissues appear to be flagging in their efforts to throw out the gonococcus. If and when the symptoms have settled down to a morning gleet with clear urine containing heavy threads and the patient seems to be making no further progress towards recovery, it is essential to make a thorough and detailed examination to discover the cause. It lies in defective resistance or/and in one or more badly draining foci. The blood is tested for the complement fixation reaction, and if this is not found to be strongly positive, vaccine treatment is instituted. It is impossible to give precise directions for the administration of vaccines because so much depends on the make of vaccine employed, and moreover patients vary greatly in their response. Generally, however, I believe that the intra-cutaneous route is better than the subcutaneous, and I would start with a very small dose, say, 10 millions, which is increased by about 50 per cent. at intervals of 3 to 4 days until a definite reaction occurs in the form of a well-marked area of irritation round the site of the injection, a rise of temperature to 99° F. or perhaps 100° F. and a slight increase in urethral discharge. Thereafter I would give the vaccine once a week, increasing the dose in a way which I calculate is likely to provoke such reactions as the above. The blood is tested after two or three weeks, and if the C.F.T. has not increased in strength I consider it as an indication for changing the vaccine or its method of administration. The search for the badly draining focus can be very tedious, and I doubt if many general practitioners would find it worth while to spend the time which a thorough examination of this kind entails. The first essential is to discover if the trouble is confined to the anterior urethra, and, to determine this, the anterior urethra should be washed out thoroughly before the specimen of urine is taken. If this specimen is perfectly clear and threadless, and the prostatic and vesicular fluids are found to be free from pathological elements, one can concentrate on the anterior urethra with reasonable certainty of discovering the defect. Shrewd palpation of the urethra is valuable as it may disclose abnormal thickenings which can be investigated more thoroughly later with the urethroscope. Naturally a careful search for para-urethral canals is necessary, and the urethroscopic examination must be very searching as some foci can be very small and innocent-looking. When any focus is found I open it with the electric cautery, being afraid of using a knife in aero-urethroscopy because of the risk of air embolus. The opening is followed by systematic dilatation, at intervals of 5 to 7 days, with a Kollmann dilator. If the prostate and/or vesicles are at fault, periodical massage is best supplemented by diathermy applied to this part through the rectum with a suitable electrode, the neutral pad being on the abdominal wall.

In the treatment of gonorrhœa in females similar principles are observed. Drainage is helped by douching the urethra and vagina daily and by insertion into the vagina of a dressing of gauze soaked in glycerine medicated with some mild antiseptic; a yard of gauze folded lengthwise in four is a suitable size for the dressing, and it is paid off into the upper part of the vagina leaving a tag outside for ease of removal next morning. In cases where the patient finds it impossible to attend frequently for treatment on these lines I have found that the application of 10 per cent. freshly prepared mercurochrome-220 every 5 to 7 days is very useful. The vagina and cervical canal are first thoroughly cleansed by swabbing and then an urethroscopic swab soaked in the mercurochrome is inserted into the cervix. It is left there whilst the vagina is painted down with mercurochrome and then a fresh swab is inserted into the cervical canal and left there for a few minutes. The patient is instructed to douche daily with a mild antiseptic. The vaccine therapy is on the same principles as in the case of males.

It is impossible in the available space to describe at all adequately the treatment of complications, and I can say only that for abscesses such as peri-urethral or Bartholinian I prefer aspiration followed by injection of electrargol or of 1 per cent. mercurochrome to incision. In gonorrhœal ophthalmia drainage is all important, and on the least doubt about the pus getting away freely I would slit the outer canthus; for the rest, I have relied mainly on hourly douching with boric acid lotion and daily painting of the mucous surfaces of the lids with 2 per cent. silver nitrate. Throughout the treatment of gonorrhœa and in tests of cure laboratory aid is indispensable, and in this I would include not only microscopic examination of smears, but cultures and the complement fixation test. The question of employing cultures may be difficult when the worker is far removed from a laboratory. It can be partially solved by drawing the secretion into a capillary pipette and posting this, after sealing the open end of the capillary. In testing for cure, although we may perhaps be not quite in a position to say that a positive complement fixation reaction some weeks after disappearance of all signs means that the patient is certainly still harbouring gonococci, such a finding is highly suggestive and calls for a repetition of all the other tests, with provocation designed to unearth buried foci. Naturally a steady diminution in the strength of the reaction after the signs have disappeared is valuable support in concluding that the infection has been eradicated.

SOFT CHANCRE

The term soft chancre is applied loosely in this country to all ulcerations of the genital organs that are not syphilitic or malignant. In the present sketch it will be impossible to discuss granuloma venereum or lymphogranuloma inguinale. In any ulceration of the genital region the first question is whether or not the condition is syphilitic and, whatever the clinical appearance, specimens should be taken for microscopical examination. If the specimen has to be posted, the simplest plan, after cleaning the sore with water or saline and scraping its edge, is to let the serum run into a capillary tube, one end of which is sealed in a flame. Pending a positive result I take specimens every day for some days and meantime dress with hypertonic saline (2 per cent. sodium chloride with 0·5 per cent. sodium citrate) avoiding antiseptics, which make the discovery of *S. pallida* difficult if not impossible. A specimen of blood is also taken, and it is a good rule in every case not meanwhile diagnosed as syphilitic to repeat the blood-tests for three months. Most soft chancres yield to saline dressings, soaking in eusol, iodoform dusting, and painting with 2 per cent. mercurochrome. For those which do not, the local applications which have been advised are numerous enough to occupy a long article, and it is impossible to detail them here, but generally it may be well to say that coagulating lotions and drying powders ought to be avoided as they can easily provoke the formation of a bubo. For the typical soft chancre one remedy is invaluable. This is the intravenous injection of the Ducrey bacillus vaccine called dmelcos. The first dose is usually 0·5 c.cm.; the second, given two days later, can be 1·0 c.cm., and this can be repeated on alternate days according to progress; usually only three or four doses are necessary. Each injection usually causes a smart rise of temperature, but the accompanying constitutional disturbance is not troublesome if the patient has taken the precaution of going to bed. If a bubo occurs, the most satisfactory treatment is to aspirate the contents through a fairly stout needle introduced, through healthy skin if possible, at the external pole of the swelling. The aspiration may be supplemented by injection of a few c.cm. of colloidal silver; it may have to be repeated two or three times as the cavity refills. If the skin is on the point of breaking, a very small incision, in length equal to the width of a bistoury, across the lower and internal pole, followed by insertion of a small wick of gauze is better than a free incision.

SYPHILIS

If practitioners would appreciate the enormous difference it makes to the patient when the treatment is commenced before the serum reactions have become positive, they would avail themselves promptly of the microscopical test much more freely than they seem to do at present. It is very easy to scrape a sore and let the juice run into a capillary tube; all that is necessary is to keep the scraper (say a vaccination lancet) and a supply of capillary tubes at hand.

On what constitutes an adequate treatment of early syphilis the divergence of opinion is still very confusing. Various experimental courses have been tried at St. Thomas's Hospital, but the results from none of them have withdrawn my allegiance from a straightforward unit course consisting of 10 weekly injections of " 914 " intravenously with an equal number of an insoluble preparation of bismuth. This course differs from that which I formulated in 1919 at St. Thomas's Hospital in dispensing with intervals of two weeks after the third and fifth injections and of three weeks after the seventh, as later experience seems to show them to be unnecessary. The dosage of " 914 " is 3 × 0·45, 2 × 0·60 and 5 × 0·75, and that of the bismuth compound such as to contain 0·24 to 0·32 grm. metallic bismuth (say 3 c.cm. to 4 c.cm. of a 10 per cent. suspension of bismuth oxychloride which—the salt—contains 80 per cent. of metallic bismuth). For women, and for men who are rather under weight or react strongly, the dosage of " 914 " does not exceed 0·60 grm. In a number of cases I have varied the bismuth treatment by giving a lipo-soluble compound, such as the campho-carboxylate, in a dose of 2 c.cm. twice weekly, but am not in a position to say that it gives better results. Nothing has occurred to shake my conviction that the bismuth should be given concurrently with the "914." On the contrary, it has been strengthened by the report of a careful analysis of results of treatment carried out recently in the United States by five first-class clinics. In this report appeared the following[1], written, I believe, by Dr. Earle Moore, who had hitherto been an advocate of alternating arsenical courses with courses of "heavy metal": "It seems an inescapable conclusion that this omission of some heavy metal treatment during the first course of arsphenamine is a factor in the much higher incidence of early infectious relapse and neuro-recurrence at Clinic B. In early syphilis, including early latency, treatment with a heavy metal should be started before the conclusion of the first arsphenamine course, and should completely fill the interim between courses." The number of courses that should be given is difficult to decide. In some cases very little treatment seems on later observation to have eradicated the disease, but it is a bad mistake to risk a relapse, and the patient who is determined to have everything possible done to eradicate his infection is not interested in forms of treatment affording less than 100 per cent. of success. Accordingly I do not feel justified in advising him to have less than three such courses as the above, if his serum reactions are not yet positive. If they are positive, I advise three after that course which ends with negative reactions. Later experience has inclined me to shorten the interval between any two courses to six weeks. In later cases with no symptoms much depends on the state of the spinal fluid. If this is negative, after an initial course as outlined above, I rely mostly on bismuth, a practice which is supported by the American analysis already mentioned, in which treatment solely with heavy metal appeared to have given as good results as that with arsenic and heavy metal. It is necessary to continue the treatment for some years before the serum reactions become negative. It is incorrect to say that in most of these cases the serum reactions are unaffected by treatment. In most cases the true strength of the reaction is not titrated out to an end point. When it is, as occurs automatically with the Sigma test, the effect is usually noticeable by the end of the first course. When the spinal fluid is found to be positive in a case of more than three or four years' duration treatment on the above lines is unlikely to convert it to negative, and after an initial course of "914" and bismuth it seems best to change over to courses of tryparsamide (1 × 2 grm. and 9 × 3 grm. at weekly intervals) in conjunction with bismuth. The work of Hanzlik and colleagues[2] indicates that a bismuth preparation in which this metal is anionic penetrates the central nervous system much more successfully than one in which it is present as a base, and, in lieu of sodium iodobismuthite (in iodobismitol) which they used, I give iodobismuthate of quinine in a dose of 3 c.cm. of a 10 per cent. suspension twice weekly throughout each course of tryparsamide. Patients who show no intolerance of tryparsamide, in the form of disturbance of vision, seem able to stand very large total amounts of this remedy, and five or six courses at intervals of about six weeks are not excessive treatment. Malarial treatment is very valuable in cases of syphilis of long standing with positive spinal fluid, but it is not yet sufficiently convenient to obtain it for average patients in such safe circumstances that it can be recommended in the absence of symptoms of G.P.I. When, by the establishment of centres for this form of treatment, it becomes possible to apply it safely as a matter of routine, we can look forward to a considerable reduction, if not a complete abolition, of the incidence of G.P.I.

References

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[2] Hanzlik, P. J., Mehrtens, H. G., Gurchot, C. and Johnson, C. C.: *Journ. Amer. Med. Assoc.*, 1932, xcviii, 537.

MODERN METHODS IN THE TREATMENT OF CHRONIC ARTHRITIS

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IT is not proposed to present a discourse upon the various types of chronic arthritis, nor to preface the subject by a classification or even to engender unwise endeavour in the matter of propounding a formula or clinical word picture of each separate entity. Rather it is proposed to examine the fundamental principles of the handling of the *arthritic* aspect of rheumatoid arthritis and hypertrophic osteo-arthritis. The systemic aspect of the former has been dealt with elsewhere[2], [4] and that of the latter is either of minor importance or is immediately obvious.

RHEUMATOID ARTHRITIS

By rheumatoid arthritis is meant a systemic disease of unknown origin with deviation from the normal in both biochemical and metabolic aspects, though infection is thought to be an essential factor. The main manifestation is a non-suppurative polyarthritis of subacute or chronic type which tends to deformity of varying degree and expression. While conceding that the spectre of financial distress holds the stage throughout every act, yet the successful treatment of rheumatoid arthritis can only be achieved by realization of the following statements: (1) A correct diagnosis and business-like assessment of defects is essential. (2) The treatment of every case of rheumatoid arthritis is orthopædic from the very start. (3) Prolonged rest is an absolute necessity in the early stages, and education of the patient most desirable.

(1) *A correct diagnosis is essential.*—To diagnose rheumatoid arthritis in the early stages is by no means easy, and to be oblivious that counterfeit cases exist

is but to court disaster. Some of the difficulties encountered are of the following nature : inflammation of the synovial membrane is sometimes masked by obesity; one form of gout simulates rheumatoid arthritis closely; disordered metabolism in women at or about the climacteric may mimic rheumatoid arthritis almost exactly; cases of mixed arthritis[3] occur in which infection, oblique metabolism and degeneration proceed cheek by jowl beyond the pattern exhibited by simple cases.

Investigation for the purpose of diagnosis is not the formidable affair usually presupposed. Clinical observation in the light of past experience stands first. Radiograms add their quota of knowledge to this, while the suspension stability of the erythrocytes denotes the degree of infective activity. Moreover, a leucocyte count helps to determine the phase of resistance to infection and a blood uric acid estimate together with a blood urea examination help to determine the likelihood or otherwise of a gouty factor.

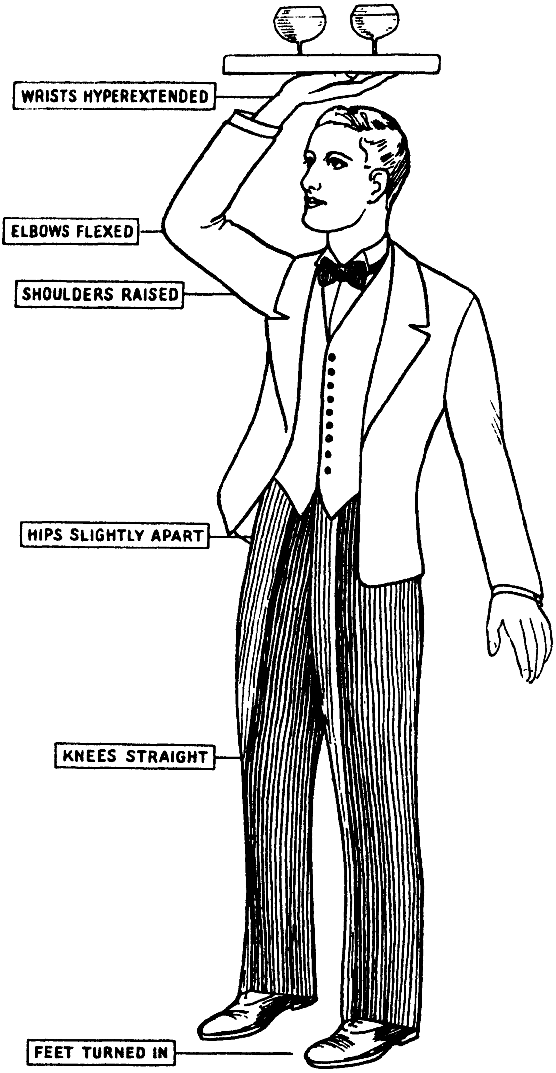
(2) *The treatment of every case of rheumatoid arthritis is orthopædic from the very start.*—This statement requires qualification. It is not meant to imply that only an orthopædic surgeon is capable of treating a case of rheumatoid arthritis or even that he should do so unaided. In the stage before deformity occurs the medical practitioner is usually the only individual who can undertake successfully the prevention of deformity. If, or rather when, this occurs the patient is in urgent need of close liaison of physician and orthopædic surgeon. Within limits it is possible to lay down certain rules in respect of the immobilization or otherwise of joints during the various stages of rheumatoid arthritis. Before doing so it is germane to visualize what morbid changes are likely to occur in any given joint during the march of the disease. Initially the synovial membrane and capsule bear the brunt of the infection. Thereupon temporary arrest may be occasioned at any stage

between the following extremes—either pain evoking muscular spasm and tendon contraction forbids movement and results in the jamming together of articular surfaces with obliteration of inter-articular space and fusion of joints in faulty alignment, or else persistence of movement against strain induces a villous reaction which fills all available space and leads to erosion of articular cartilage and finally to adhesions, fibrous or bony.

In general it may be stated that non-weight-bearing joints, such as the shoulder, tend to be involved by a plastic process, and weight-bearing joints, such as the knee, by a more florid reaction. Hence the sinister adduction of upper arm and balloon-like knees which are to be encountered in a mishandled case of rheumatoid arthritis. It follows automatically that contraction and deformity must be anticipated in the early stage of joint involvement, and that movement sufficient to prevent cobweb adhesions (which subsequently tend to organize) but insufficient to cause villous reaction should be enforced. This latter applies to joints barely affected, to joints hot and swollen, and to joints already enmeshed by adhesions, subject to certain considerations to be referred to later.

Prevention of deformity and contraction : It is within the power of every medical practitioner to prevent much deformity in the early stages of development of rheumatoid arthritis in any given joint. Tendency to restriction of the range of movement of a joint necessitates the assumption of a correct position, if need be in splints or in plaster casts, relieved in the former case by daily movement. Correct positions may be envisaged by the stance of a waiter who has just raised a moderately heavy tray above his head. The fingers are nearly extended with slight deviation towards the thumb; the wrist is dorsi-flexed; the forearm is somewhat supinated; the elbow is flexed at about 90°; the shoulder is in extension; the hips have the femora slightly abducted; the knees are extended fully, or nearly so; the feet are at right angles to the lower legs and slightly inverted.

Let it be clear at once that the arm-above-the-head attitude is only necessary if the shoulder is affected, and if the wrist alone is involved there is no occasion to supinate the forearm, but whatever joint is involved the waiter's stance is the key to the position to be



adopted.

Movement: " A movement a day keeps adhesions away " is a good motto. A full movement, active if possible, otherwise passive, should be carried out by all joints not limited by adhesions. These movements should be without strain, that is to say, no joint should be moved while taking weight but a good masseuse can coax movement in even a very painful joint. Sometimes relaxation can only be attained in a hot bath after the taking of aspirin. If insufficient movement is obtained owing to pain and muscle spasm periodic movements under gas anæsthesia should be carried out. No hot swollen joint should be allowed to bear weight.

Exception to the rules of " a movement a day " and " no weight bearing by swollen joints " can be made with benefit to the patient either when there are facilities for treatment in the hot pool or deep baths at Bath, where the rationale of under-water manipulative treatment and re-educative exercises is specialized, or when skin-tight plasters are used. These deserve a special note. My surgical colleague, Mr. Kindersley, is perfecting a special technique in certain mutual cases with a view to eliminating in part the time factor. Briefly, by immobilizing joints completely in the early stage, short of the organization of adhesions and short of that atrophy of bone which personal experience has proved to occur in normal joints encased even for a short period in skin-tight plaster, it is hoped to be able to reduce that period of absolute rest which patients find so hard to bear once their fatigue has been overcome and their hopes marshalled.

When deformity and contraction have already occurred, a movement a day in the range limited by spasm or adhesions should still be continued, but swollen knees, everted feet and the like spell bed and chair till these are corrected. In many cases in which there are no organized adhesions it is possible to extend the knees completely by application of a modified Macintyre splint[4] frequently readjusted, while many contracted joints may be relaxed entirely under anæsthesia. If there are adhesions, however, and these either cause pain or limit the function of a joint beyond the threshold of utility, manipulation will have to be considered.

It is beyond the scope of this paper to discuss manipulation in detail, much of which, though not all, pertains to pure orthopædics, but several points are worthy of note : (1) Radiograms are essential, but their use is limited. (2) It is desirable to estimate the sedimentation rate before undertaking manipulation. (3) Manipulation never seems to result in a flare-up of a pyogenic nature. (4) Leverage should be short, and it is wiser to manipulate in series rather than to do too much at any one period. This applies to manipulation of a single joint as well as of several. (5) It is good policy to take an X-ray after manipulation. The bones in rheumatoid arthritis are very friable and the snapping of a bone may be regarded as that of a tough adhesion.

Orthopædic apparatus, sometimes of a simple nature, for example cockup splints or light plaster casts for flexed wrists, but more often complicated and expensive in the way of walking calipers and the like, is sure to be required. Here the advice of an orthopædic surgeon must be sought and it should be stressed that lightness is essential in view of the increased fatiguability of the muscles which is a feature of rheumatoid arthritis.

(3) *Prolonged rest is a necessity and education of the patient desirable.*—In the early stages most of the 24 hours should be spent in bed. Fatigue has to be overcome, temperatures have to settle down and the resistence has to be built up. Education is an important factor in every case. Patients must be

taught to live within their physiological income, that the joint capital must not be encroached upon and that no joint must be used beyond its capacity. During the period of rest and education, apart from the systemic aspect of the disease, the treatment of the joints themselves by electrical methods and external applications is one requiring observation and trial. Scott's dressings, inunction of mercury, diathermy, ionization, the cautery or blisters may all be called upon, to name but a few therapeutic measures. Aspiration of a joint is often good practice, followed by the firm application of Scott's dressing. This applies particularly to the knee joint to prevent lax crucial ligaments and outward and backward subluxation of the tibia and fibula. Skilled massage is essential and Faradism to control the wasting of muscles about the joints often desirable.

Journeying to and from a clinic except in the ambulatory stage is to be deprecated. For those without or with but limited means the rheumatic hospitals of Bath, Buxton and Harrogate are without rival. Spa treatment if properly used is beneficial throughout the course of the disease, for the correction of abnormal function. This may be sedative, tonic, eliminative, and what is probably most useful of all in rheumatoid arthritis, re-educative, by means of active and passive movements carried out under water, often with manipulation.

It will be seen that it is impossible to define within exact limits to what extent the medical practitioner should treat a case of rheumatoid arthritis unaided. The social position of the patient, the facilities for exact investigation, the amenities of environment, the opportunity of skilled opinion, personal ability and so on should all influence the issue.

HYPERTROPHIC OSTEO-ARTHRITIS

By hypertrophic osteo-arthritis is meant a chronic degeneration affecting the joints in those of middle and late life, particularly the hips and spine of men, the knees of women and the terminal phalangeal joints (Heberden's nodes), in the so-called leisured classes. Wear and tear seem to be the determining factors though there is a familial strain to a minor extent. Pathological and clinical features must be considered side by side. Lack of nutriment, either synovial or arterial, leads to devitalization of the articular cartilage (the intervertebral discs in the case of the spine). As a compensatory mechanism, inter-articular space is lessened and the patient experiences stiffness and a diminished range of movement. If movement is persisted in, osteophytic outgrowths occur in a further attempt to limit function. If constant movement is maintained, there occurs erosion of cartilage, spasm of muscles and marked pain.

Some degree of hypertrophic osteo-arthritis is to be expected in the decline of life, almost as certainly as the advent of grey hair, but on the onset of symptoms an exact diagnosis should never be neglected. This can be accomplished by radiological examination and the chief difficulty experienced in early cases is the decision as to how far the lessening of inter-articular space and the presence of osteophytic lipping are commensurate with the age and occupation of the patient, apart from his symptoms. It would be unwise to be dogmatic about the frequency with which villous reaction precedes bony lipping. This reaction is known to be the prelude of osteophytes in some instances of the arthritis which attacks the knees of women at the time of the climacteric[6], and it has been suggested that the first stage of hypertrophic osteo-arthritis of the hip may occasionally be villous. Clinically, however, this reaction is absent in the production of Heberden's nodes, occurs but rarely in the hips and when present in the knee is usually secondary, as radiograms taken when the synovial membrane first becomes palpable usually reveal lipping of considerable duration.

Lack of space prevents discussion of such occupational disabilities as driller's elbow and signalman's shoulder and attention will be focused on but three of the types of hypertrophic osteo-arthritis.

Hypertrophic osteo-arthritis of the spine.—This affects men to a greater extent than women, especially those who have exceeded the sixth decade. Beadle's[1] work goes to prove that primary changes occur in the discs. Inter-articular narrowing results and, in order that the increased vulnerability to jars and strain be lessened, mobility is curtailed by increased rigidity, through the agency of osteophytic outgrowth. The resulting deformity is usually kyphosis. By the time osteophytic reaction is demonstrable by radiograms, what may be termed the more active phase of the morbid process has passed and the chief complaints are those of rigidity and stiffness, partly muscular in origin. Spondylitis osteo-arthritica, a disorder often lacking marked systemic disturbance, must not be mistaken for the ankylosing spondylitis of younger men in which infection and disordered metabolism play prominent roles. In ankylosing spondylitis, apart from the help afforded by the different age period, by the severity of pain and by immobility, pyrexia, increased sedimentation rate and low blood calcium the diagnosis is straightforward in that, in nearly every case, fusion of the sacro-iliac joint is revealed by radiograms at an early date.

Some sort of support may be deemed helpful but as a rule the remedy is worse than the disease. Active movements in a deep bath or passive ones in a pool bath are usually successful in restoring a modicum of function. Attention directed towards the reduction of obesity and the correction of a prominent abdomen, together with breathing exercises are often desirable.

Patients should be warned to live within their physiological reserves and the referred pain occasioned by arthritis of the cervical vertebræ, for example, should be catered for by diathermy, coal tar drugs, rest, and such support as is afforded by the Richmond head-rest, an inflatable rubber cushion made in the shape of a crescent which lessens discomfort during travel by rail or road.

Hypertrophic osteo-arthritis of the knees.—This occurs especially in women over the age of fifty[5]. There is creaking, difficulty in kneeling or in complete flexion of the knees, stiffness and pain. The patella rides close to the articulation and effusion may occur if the joint is submitted to overstrain, either continuous or sudden. In these circumstances repeated over-use results in a villous hypertrophy which calls for the same therapeutic measures and precautions as those laid down for the hot, swollen joints of rheumatoid arthritis. Attention to flat foot, rest, diathermy, mud packs, and resistive exercises are important secondarily only to a corrected regime and modified life. Patella movements require mention; these should be both passive and active. There should be passive movements from side to side and active upward movements carried out by contraction of the quadriceps extensor muscle when the limb is relaxed. This movement is concerned in the tautening of the synovial membrane during movement of the knee joint and an efficient response lessens the likelihood of a nipped fringe. Faradism is often required for the wasted vastus internus and contrast douches are excellent. The orderly regime of a spa may be necessary to inhibit the activities in their respective spheres of the middle-aged society woman and those of the housewife.

Hypertrophic osteo-arthritis of the hip.—Men beyond the age of fifty are affected in the proportion of at least nine men to five women[5]. The disorder is unilateral at the outset, but as a natural sequence the second hip is liable to be affected also. Inability to reach the boot or to straddle a stile is usually the first complaint, and pain in the groin, hip or knee follows. Wasting of the gluteal folds, limitation of abduction and flexion are noted on examination, and then either further restriction of movement occurs without excessive pain or else pain becomes so pronounced as to destroy sleep and undermine the general health as well as to limit movement. That is to say, limitation of movement is bound to occur and it depends largely upon misguided attempts to forestall loss of movement how much pain is experienced. Eventually the head of the femur may be held in the acetabulum in the position of flexion, so that when the back lies flat on the bed there is flexion at the knee. Such a state of affairs can hardly be relieved by extension or calipers, and only a plastic operation can avail much. The reader is referred to the Hunterian lecture by Mr. Max Page for the scope and nature of such a procedure[7].

In the earlier stages there are briefly three main disabilities to be combatted; pain, muscle wasting and loss of movement. *Pain :* Pain calls for rest, which may be absolute (with or without extension by weight and pulley) or relative, drugs of the coal tar series, codine and hyocyamus, and diathermy. *Muscle wastage :* Here massage is paramount. *Loss of movement :* Obviously some form of exercise is necessary without weight bearing. Fortunately there is at our disposal just that form of treatment which allows of movement outside the influence of gravity, in a supporting medium and at such a temperature that spasm is relaxed. The deep baths at Bath are so constructed that these are entered by descending shallow steps which lead to a bath below the level of the floor. The natural water is hyperthermal and is of such bouyancy that movement is aided and not restricted. The patient stands in water almost up to his neck and moves about the floor of the bath carrying out the movements prescribed by his physician. The pool bath is a specialized form of deep bath. Here the patient lies in a sling and the attendant carries out passive movements to his limbs which are submerged and lying free. The fact that many cases of hypertrophic osteo-arthritis of the hips return to Bath year by year to regain once more the loss of movement which twelve months of greater activity in ordinary life must demand as a toll, is proof in itself of the efficiency of this line of treatment.

If the femur is not flexed in the acetabulum and if either pain is of such a degree or loss of movement is so restricted that the function demanded by the patient is too little to make life worth while, then the question of some form or modification of a Thomas walking caliper is to be considered, especially if the second hip is becoming involved. The question of deep X-ray therapy must be dealt with by experts in the subject. It may be said, however, that the writer has no reason to believe that better results are obtained on the Continent than in Britain. The amount of movement allowed to a patient with hypertrophic osteo-arthritis of the hips can be controlled in measure by the following observation. Some pain and stiffness are to be expected when rising after lying or sitting at ease for any length of time. This, however, is of no consequence in determining whether or not the joint is being used too much. On the other hand, pain coming on during exercise or at night sufficient to interrupt sleep means that the joint is being used beyond its capacity.

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MODERN METHODS OF TREATMENT IN OPHTHALMOLOGY

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OF recent years ophthalmology has undoubtedly made very definite advances in several directions, some of them depending upon and running parallel with similar advances in the sphere of general medicine, and some of them involving the speciality of the eye alone. As typical of the first class may be taken the modern method of approaching the treatment of infective lesions of the uveal tract, while the second class is most dramatically represented by the new operative measures which are now undertaken in the treatment of retinal detachments. In this article it is proposed to give a brief review of those methods particularly which come into the special sphere of the eye, and to treat of them in so far as they come within the scope of the general practitioner.

ALLERGY IN DISEASES OF THE EYE

With regard to infections of the eye generally, the most important change which has come over our methods of treatment depends upon the recognition of the importance of allergy in ophthalmic inflammations. Since rational treatment depends essentially on etiology, this latter is always of extreme importance. It has long been known that many infections of the eye depend upon the existence of infective foci elsewhere in the body, in so far, at any rate, that in many cases the removal of the focus is followed by a resolution of the ocular lesion. A considerable amount of experimental work has been done within recent years bearing on this subject, the stimulus for which has been an attempt at the establishment of evidence for the theory of elective localization of certain organisms in individual tissues. It has been shown beyond doubt that organisms in the blood-stream can excite an ocular inflammation; and it has also been shown that such an infection can produce a state of hypersensitivity in the ocular tissues. Once such a hypersensitivity has been developed, any later contact of the sensitized eye with the specific bacterial products results in the renewal or recrudescence of the ocular inflammation, a condition of things quite comparable to that occurring clinically from foci of infection occurring elsewhere in the body. In this event it is seen that the stage is occupied not so much by the bacteria as by the local allergic state to which their presence has given rise, and treatment must therefore be directed accordingly.

To particularize: It is now recognized that allergic conjunctivitis is a very common condition, corresponding to other allergic affections of mucous membranes, as hay fever, vasomotor rhinitis, or asthma, or of the skin, such as urticaria, eczema, and so on. The treatment of these is extraordinarily difficult. In the cornea, interstitial keratitis seems frequently to be allergic in nature: the cornea is sensitized by the direct invasion of treponemes in fœtal or very early life, and a later liberation of syphilitic virus produces an intoxication of sensitized cornea which is manifested clinically as interstitial keratitis. Similarly in the uveal tract there is considerable evidence that many cases of iritis, especially of recurrent iritis, are essentially allergic, a number of them probably associated with tuberculosis; an early tuberculosis infection has occurred, and immunity has been acquired; on some stimulus, such as extreme exhaustion, the healed focus is lit up; owing to the acquired immunity the bacilli are disintegrated, but in their disintegration there is set free tuberculo-protein which produces an inflammatory reaction in the allergic eye.

The first and obvious course in the treatment of these conditions is, of course, the elimination of the primary source of infection—a task which is sometimes difficult and may be impossible. Apart from this, and the usual local measures of atropine, heat, and so on, several alternatives may be tried. What would appear to be the remarkable allergic quality of many endocular inflammations would seem to make the eye suitable territory for the exploitation of non-specific protein therapy, and certainly the remarkable results achieved from time to time justifies its use on many occasions. The materials most usually employed have been injections of milk, diphtheria antitoxin, or intravenous typhoid vaccine in order to set up an acute reaction, and tuberculin to produce a more sustained effect. Although the mechanism of the reaction produced by these substances has been the subject of wide and extensive study, no conclusions have yet been reached as to their rationale; moreover, in their general and local reaction it is common knowledge that their results are irregular and impossible to foretell; but in many cases the results are fully justified, although care must be exercised in each individual case that the patient is able to withstand the general reaction, that his eye is in a position to cope with a temporary augmented local inflammation, and that the patient shows no peculiarities of hypersensitivity or untoward reaction towards the particular protein employed.

DISEASES OF THE CORNEA

With regard to new methods of treatment of diseases of the cornea, one or two innovations in technique deserve passing mention. The value of contact glasses—small finely-ground lenses which fit on to the sclera round the limbus and are worn under the lids—is just coming to be recognized. By eliminating the corneal refraction they are of immense benefit in such cases of highly irregular astigmatism and conical cornea, whose visual defect when corrected by spectacle lenses amounts to practical disability. In cases also wherein exposure of the cornea becomes a preponderant factor in the prevention of healing—such as in neuro-paralytic keratitis or in chronic or recurrent ulcers in an anæsthetic cornea—their protective value may tip the balance for good in the course of the disease. Their use, however, is limited by the intelligence of the patient and their expense, and their prescription must be undertaken by a skilled refractionist in conjunction with a good optician. In the treatment of corneal ulcers the value of radiation with ultra-violet light should not be forgotten. Ulcers of practically every type respond well with such applications, but it is in the more severe, the chronic, and the recurrent forms that the treatment is seen to the best advantage : in hypopyon ulcers, for example, a greater chance of recovery is offered than can be expected from cauterization, with, at the same time, less permanent damage to the cornea. Acute and recurrent phlyctenular ulcers also provide a very suitable field for radiational treatment associated with efficient diet and hygiene. Radiation of the cornea, of course, which does not involve damage to other structures of the eye, and which therefore necessitates the employment of a localized and finely focused beam of light, calls for special apparatus and specialized technique.

RETINAL DETACHMENT

The most dramatic innovation in the treatment of diseases of the eye is certainly the new methods evolved for the treatment of retinal detachment. Up to quite recently this was a condition which held out very little hope of cure indeed; an infinity of suggestions have been made from time to time, and numberless procedures have been tried, all with little or no success, and except for sporadic instances, the discovery of a retinal detachment was tantamount to the loss of vision in the eye concerned. It came to be recognized, however, that in a very large number of detachments a retinal hole was present, and since the more minutely these tears in the retina were searched for, the more invariably was their presence found to be established. A special significance therefore came to be attached to their presence, a significance accentuated by the observation that when a hole was present medical methods of treatment such as prolonged immobilization, eliminative treatment, and so on, were almost invariably without permanent value. The conception of the obvious corollary that closure of the hole might lead to reposition of the retina, and its adoption we owe in practice to Professor Gonin of Lausanne.

While our ideas of the etiology of retinal detachments are yet by no means crystallized, it may be taken as a working hypothesis that many of those cases which have been considered idiopathic are essentially due to mildly infective or degenerative changes in the choroid and retina : the former type, of course, are frequently associated with myopia. Such changes determine a weakness or a destruction of an area of the retina, and also parallel degenerative changes in the vitreous body. At the affected area adhesions between the broken-down vitreous and the retina occur, and on the receipt of a small trauma or even an unrecognized jerky movement of the eye or body, a tear occurs; once this happens fluid from the degenerated vitreous passes through the hole behind the retina, and induces a detachment. The object of the new method of treatment is to close the hole and thus prevent the entrance of the fluid vitreous to the inter-retinal space and at the same time to stir up a localized and controlled inflammatory process in the surrounding region of the choroid, which would tack the retina down, initially by plastic exudation and finally by fibrous tissue.

Gonin's original suggestion was to insert a cautery through the sclera at the point corresponding to the site of the retinal hole, and to introduce it into the eye, thus searing off the hole and initiating an inflammation in the surrounding choroid. This, however, suffered from three disadvantages: the accurate location of the hole on the sclera is difficult and requires much time and practice; in the presence of several retinal tears several operations had to be done; and the tissue reaction to cauterization tended to be so severe that the retina in the immediate neighbourhood occasionally became so weakened as to lead to the formation of new holes subsequently. These difficulties were to a considerable extent overcome by a subsequent operation whereby a number of small trephine holes, extending down to the choroid, were made in the sclera in the region of the retinal tear, and these were cauterized chemically; but still more recently the conditions seem to have been met more satisfactorily by the employment of coagulative diathermy both to close the tear and excite a reaction surrounding it. This operation gives successful results in from 30 to 50 per cent. of the cases undertaken—a very different aspect from the hopelessness of the position a few years ago. Long after-histories, of course, are not yet available, but so far as they go they are satisfactory. The operation itself is highly technical; but, from the point of view of the practitioner, the important thing is the new hope which can be given to the patient. In the case of a simple detachment (i.e. in the absence of a tumour), provided the eye is reasonably healthy, and the detachment is not of long standing (for in these cases time is an important factor not only in the technical result of the operation, but also in influencing the amount of visual recovery possible), and provided retinal tears exist which are not too extensive, not too numerous, and in a reasonably approachable part of the fundus, the patient should undoubtedly be given the benefit of operation, and be kept resting as quietly as possible until this can be arranged.

GLAUCOMA AND CATARACT

With regard to glaucoma, little new in the methods of treatment, both by medical or surgical measures, has emerged of recent years; but in the surgical treatment of cataract one point may be worth while mentioning. It is the classical conception that operation for cataract should not be undertaken until the patient is practically blind; and if the condition is bilateral and the two lenses are affected with about the same degree of opacity, the long wait before operation entails, in many cases, a period of economic stress and psychological depression. Although it may be contended that the classical method of operating for cataract can usually be undertaken—especially in patients over sixty years of age—while the cataract is still very immature with little risk or technical difficulty, the newer methods of the extraction of the lens in its capsule obviate any difficulty in this respect, since the question of the maturity of the cataract or the retention of soft lens matter in quantity in the eye does not arise.

SQUINT

In few ocular affections can the general practitioner do more valuable prophylactic work than in the treatment of squint. During the years which have passed, too little attention has been paid to the essential feature in most squinting eyes—the vision—

and too much to the purely cosmetic aspect. A policy of inaction early in the condition, and a reliance on a hope that the child will grow out of it usually results in the development of a practically blind eye, whether the deformity be corrected later in life or not. The essential aim in the treatment of squint should be the restoration of full function to the eyes, and the rectification of the deformity follows as a necessary corollary of this, for once stereoscopic vision is established, the possibility of relapse is remote. Treatment should be commenced the moment a squint, or a temporary tendency to squint, is noticed. The first essential is the attainment of good vision in the two eyes, and to this end the non-squinting eye should be occluded; in general terms the younger the patient the more readily does the squinting eye respond to the function thus forced upon it. As soon as possible any refractive error of magnitude should be corrected with glasses. Once both eyes are possessed of good vision, the vision of the weaker eye should be maintained by periodical occlusion of the good eye, until such time as it is possible to excite the child's interest sufficiently to make it a co-operative partner in orthoptic treatment. With the extremely adaptable and improved amblyoscopes now available, and the wide extension of this treatment throughout the country, a very great deal of progress can be made—much more than was anticipated a few years ago. Any operative measures which may be required to bring the visual axes into parallelism should be preceded and followed by such treatment, and should be undertaken early, so that a well-developed binocular sense can be developed while the central nervous system is still sufficiently plastic to enable it to be facilitated and to be retained.

SOME MODERN TENDENCIES IN THE TREATMENT OF DISEASES OF THE SKIN

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OF dermatology it may be said that there is no specialized branch of medicine in which the demands upon the practitioner are so numerous and varied. He must have a good memory for shape, colour and all that is included in the picture of a dermatosis; he must know something of diseases of the eye, ear, rectum and genito-urinary tract; he should possess a fair knowledge of modern phases into the progress of medicine, especially that of the alimentary tract, a light hand for occasional ventures in the domain of surgery, and at least a working acquaintance with the principles of treatment by medical electricity, actino-therapy, vaccines, radium, and X-rays. This list is formidable but, though the number and potency of the aids to treatment have increased greatly of late, the principles which underlie their application remain the same, and there is no doubt that experience, and a faculty for accurate observation, are more valuable than dexterity in what, in time, becomes a mere routine.

The question of *diet,* which is exciting increasing interest and attention, may be studied from two or three different points of view. First of all, there is a group of diseases in which *deficiency,* be it of vitamins or calorie value, is the apparent cause of the skin manifestation, such as pellagra and eczema associated with rickets. Secondly, an *excess of carbohydrate* may play a contributory part in the production of eczema, intertrigo, or furunculosis; or there may be what amounts to an excess owing to systemic flooding with carbohydrate due to pancreatic disorder; in such cases the condition may be otherwise latent, so that investigation of the blood sugar is necessary to determine its existence and degree. A recent case illustrates the point.

A single young woman with threatening double cataract could not be operated upon on account of subacute facial eczema. The urine contained a considerable amount of acetone and the blood-sugar curve showed that she was a diabetic. Careful dieting with small doses of insulin resulted in rapid improvement which has persisted ever since her hospital treatment, and permitted a very successful cataract operation to be performed on one eye.

The urine of every patient with eczema should be examined for sugar and acetone; if a trace of either is present, 50 grams of glucose should be given by the mouth, and the urine collected for the next four hours. If the suspicion is confirmed by a more definite reaction with Fehling's or Benedict's reagent a blood sugar curve should be advised.

The eczema of young infants may be due to or aggravated by over-feeding, or it may be due to the presence of a protein to which they are hypersensitive in the mother's milk. Egg white is a relatively common agent and cow's milk may also be responsible. Quite recently Bray[1] attributed the occurrence of papular urticaria (lichen urticatus or strophulus) to excessive fats, especially bacon fat in the diet, and claimed good results from the omission or diminution of these and the use of a mixture of pepsin and hydrochloric acid. The question of hypochlorhydria should always receive consideration in *rosacea* and *acne*; many subjects respond well to this mixture, especially if the diet also receives consideration. A patient with acne should be forbidden sweets and cooked fats, and a patient with rosacea, all alcohol, strong tea and coffee, and the condiments in proprietary sauces. Some cases of *urticaria* do well on the acid mixture, and some of *pruritus* are also stated to improve. In pruritus without skin lesions an enquiry should be made for a history of jaundice or long-standing intestinal disturbance. Quite a considerable percentage of icteric patients suffer from concomitant, often intense generalized itching. The bile salts, if not bile pigment, may be the actual cause of the irritation in such cases, but this point cannot be determined with any certainty owing to the paucity of tests available.

The etiology of *chronic urticaria* is another frequent problem. Unfortunately each case appears to differ from the preceding, but most authorities regard the disease as belonging to the allergic group. The acute cases do not as a rule offer any special difficulty, either as regards the diagnosis or the treatment, but some chronic cases defy all the resources of modern treatment. Presuming that the case is really due to the diet, attempts should be made either by the skin tests or by the sequential addition to a basic diet of milk of each suspected article in turn, to determine the causative antigen. Not infrequently two or more of these must be eliminated from the diet before a cure is attained. In my experience protein shock methods have been more successful in achieving good results than dietary, and will be discussed below. Further, digestive disorders and anomalies of secretion play a part in the causation of urticaria; focal sepsis from an infected antrum, a chronic appendicitis, or apical abscesses in connection with the teeth may as the result of parenteral absorption of a foreign or toxic protein be similarly responsible.

Of considerable interest are the publications and practical applications of the Sauerbruch and Hermannsdorfer dietary theories. There is no doubt that in tuberculous patients a salt-free diet is a valuable addition to such other measures as may be shown in the treatment of *scrofulodermia* or *lupus vulgaris,* though I have not yet seen a complete and permanent cure by dietary treatment alone. Starvation, which induces a relative acidity of the tissues, appears to exert a favourable influence in accelerating the healing of wounds.

Allergy is very much in the air at the moment; but the actual allergen is only rarely discovered, and the value of skin tests is not great. A skin reaction is not infrequently given to several different proteins, and I have seen some in which the response to the control fluid was as great or even greater than that to the milk, egg, or other substances employed. That this is the general experience is suggested by the fact that most dermatologists have abandoned the method. The most practical alternative is to exclude each suspected article singly in turn for a fortnight at a time, and if the eczema subsides or abates to eliminate that article altogether, or to attempt desensitization by giving it like a drug in measured doses which may be only very gradually increased, as toleration is established.

Fortunately, most of the cases of infantile eczema appear to be cured on weaning, but some of them—those of the hereditary asthma, hay fever, prurigo group—pass on into chronic recurrent usually flexurally disposed dermatitis to which various names (Besnier's, or sensitization dermatitis) have been given. All of these, both infantile and adult or adolescent types, are best treated by some form of tar. Crude coal tar, in spite of its obvious drawbacks, is the most generally useful, either alone as a paint or mixed with Lassar's paste. The only contra-indication to the use of tar is the presence of purulent discharge which must first be controlled by very weak antiseptic lotions, among which a 1 per cent. solution of gentian violet in 25 per cent. spirit is most useful; it is applied once or twice daily as a paint, appears to have no contra-indications, and has largely taken the place of the silver nitrate solutions so much in vogue for septic eczematous conditions a few years ago; in the acute stages of eczematized ringworm of the extremities it is also extremely valuable; for here the etiological problem is always complicated by allergy, the specific eczematous response to the fungus growing in the horny layer, and the purulent factor caused by the secondary invasion by cocci.

Fomentations should never be used in these cases, for they increase the macerative factor which plays a very important etiological part in the clinical picture. Not only maceration but also the local application of strong antiseptics must be avoided. On two occasions I have seen generalization of a toxic œdematous eruption follow the application of tincture of iodine to a bulbous eruption on the feet. In *cheiropompholyx*, whether on the hands or on the feet, these factors should be taken into consideration and great caution exercised in the treatment. Once they have passed the acute stages the clinician must decide whether a local mycotic or some metabolic internal factor is responsible. If microscopical evidence proves the former (negative results are by no means conclusive), the skin should be locally exfoliated; for this purpose the best application is salicylic acid. Until the relative tolerance has been ascertained, caution is necessary, and at first it is advisable not to exceed 2 or 3 per cent. of the drug in a base of Lassar's paste. Decortication should occur in a favourable case in about a week, and after a rest of about ten days the treatment should be repeated at least once. These directions are purely schematic and cannot be followed in every case, for in no disease are arbitrary or dogmatic assertions so frequently falsified by the event. While some cases tend to flare up and become eczematous with relatively weak salicylic applications, others will require an actually macerating plaster containing 30, 40, or even 60 per cent. of the drug before the desired exfoliation is brought about. Between these two extremes is the average case, in which the peeling process follows spontaneously on the vesicular or bullous eruption, a fact, the significance of which has not hitherto been sufficiently realized. It indicates the only rational procedure in such cases and once again demonstrates that treatment is but an imitation of Nature at her best or worst!

It does not appear to be sufficiently recognized that the advantages of plasters owe their chief inspiration to the school of Unna at Hamburg. A most valuable recent advance is the incorporation of specific medicaments on adhesive stockinette, a material which permits of free movement of the protected part and at the same time allows full scope for all the normal physiological functions. A common indication is the localized patch of thickened or "lichenified" epidermis, known as *neurodermatitis* or *lichen simplex* of Vidal. In many cases it is only necessary to break the vicious circle of pruritus and friction at some vulnerable point, and a plaster is a very simple and inexpensive method of doing so. Patches of true *lichen planus* of the chronic type can also be cured by plasters, and many forms of localized irritable dermatitis, whatever their etiology can be favourably influenced. Practically any drug can be incorporated, and the method offers a safe and efficient vehicle for caustics. Small patches of *lupus vulgaris* and its verrucose sub-type can be treated in this way, a combination of salicylic acid, creosote and carbolic acid being especially useful. The *common wart* will often yield to prolonged maceration by a strong salicylic acid plaster, and I frequently order a 60 per cent. strength without fear of producing the unsightly cicatrices which are so apt to follow the applications of fuming nitric and other strong acids—the practitioner will do well to banish them entirely from his armamentarium. The technique is exceedingly simple:

all grease must first be cleared away from the environment so frequently soiled by ointment residua; a little benzine or methylated ether rapidly removes all traces, and the plaster is then cut exactly to the pattern and outline of the lesion. Some plasters require previous heating, but this is not necessary with most of the modern samples, which adhere without the necessity of accessory zinc strapping for as long as a week at a time, and irrespective of bathing and washing. As a single weekly inspection is all that is required in most cases the saving of time and expense is obvious.

Another safe and inexpensive weapon that has a wide field of application is the *carbon-dioxide snow pencil.* Its most frequent indication is the small vascular raised *strawberry nœvus* of infants, for the earlier these are dealt with, the better the cosmetic result.

A small apparatus includes the cylinder containing the liquid CO_2, a wash-leather bag or retainer into which the gas is allowed to escape, and a set, preferably of boxwood, of three or four different sized moulds, into which the snow is forcibly compressed. For this purpose a small hammer must be used and, to avoid splitting the wooden pistons which fit the moulds and drive the snow home, its face should be protected with a wash-leather buffer.

With ordinary care no damage is ever done and even relatively long exposures, such as would be required for epitheliomas, from 1 to 1½ minutes produce but little permanent scarring. The correct degree of manual pressure for the various lesions treated is largely a matter of experience, and depends on the relative counter-pressure exercised by underlying bone. As a general rule the amount of pressure desirable is that necessary to produce local anæmia, and the time factor is much more important. This varies from ten to twelve seconds for the infant's nævus to the limits already defined for small malignant epitheliomas of the basal-cell type.

Speaking generally, all tumours consisting of vascular tissue, or of pronounced cellular structure, are amenable to the snow treatment. In tumours consisting chiefly of fibrous tissue the effect of freezing is but slight, and this is only what would be expected as fibrous tissue is relatively non-vascular and non-cellular, and cannot give the exudative response essential for a successful result. Fibrous tumours are best removed surgically.

The after-treatment of frozen tissue is very simple; calamine lotion is applied two or three times a day, and the resulting scab is left severely alone until it falls off, in from 10 to 15 days. Scarring is always very slight, except in the treatment of lupus erythematosus, which is a spontaneously cicatrizing condition; I have never yet seen or heard of keloid or hypertrophic scars after the application of CO_2.

Those who have followed the tendencies of therapy during recent years will have been struck by the apparent eclipse of two methods of treatment which at their commencement appeared to offer great possibilities. In the case of *actino-therapy* enthusiasm was warped almost as by a blow as a result of an official and critical survey published under the auspices of the Medical Research Council.[2] The other line of treatment that has waned is *vaccino-therapy*, though perhaps not to the same degree and certainly not as dramatically as the first-named.

As regards the cutaneous indications for light therapy, and many other kinds of various lamps that are now lying idle, the scope is small. Tuberculous, more especially *colliquative scrofulodermatous*, types do best, and the general irradiation with the carbon arc lamp the best method of application. *Lupus vulgaris* does not, in my experience react so well, and relapses, as by other methods, are frequent after cure. Compared with the practically permanent results obtained in three of my own cases by six to eight months treatment in the high Alps at Leysin, they are uniformly disappointing. In *acne vulgaris* artificial actino-therapy has had a vogue; here also the results do not seem to bear a satisfactory or encouraging relation to those obtained by the conscientious application of soaps and lotions and are completely outclassed by the results of X-ray irradiation. For *pruritus*, both local and general, ultra-violet rays appear to give but very slight temporary relief, and in the local types at any rate are far excelled by the effects of the X-ray. In speaking thus of actino-therapy it would be unjust to forget the extremely valuable results that are still obtained daily with the Finsen lamp, which has now been in continuous use as a local agent in the treatment of lupus vulgaris since 1893. Forty years is a good test of any method, and few in medicine have survived as long.

Uniformity of result is the acid test; this perhaps explains the gradual decline of *vaccino-therapy*. From the very first its uncertainty both as a preventive and curative agent became apparent, and it is now realized that the results of non-specific injections, both subcutaneous and intravenous are as good as, and certainly less expensive than, the autogenous vaccines which have the further drawback that their preparation consumes at least a week of valuable time. The chief difficulty of the treatment is the selection of suitable cases, and next the choice of the therapeutic agent. Two common dermatoses appear to stand out in this connection, *urticaria* and *furunculosis*; the former is not infrequently cured by a course of auto-hæmotherapy, but a considerable percentage of cases fail to react, and seem to require more vigorous " shock " tactics, on which non-specific protein injections depend. The best known method at the present time is the intravenous injection of typhoid vaccine. From 30,000 to 200,000 are injected in increasing doses according to results and with a due regard to the reactions of the patient. Subjectively these include rigors, more or less severe headache and lassitude, and a temperature which may rise as high as 104°F. There is a coincident drop in the leucocyte count. The mere number of the protein preparations available for intramuscular and intravenous treatment, put up and recommended by various firms, is an indication of the inherent weakness and unreliability of this method of treatment.

While the majority of us are still the faithful disciples of the germ theory ot disease it must be admitted that the weapons availed are by no means as efficient as they would be if that theory were the only factor in the reaction of the organism. Fortunately but few of them are dangerous, and in dermatology only one or two demand a special care in their administration. *Gold compounds,* which have been found useful in the chronic forms of lupus erythematosus, and have been recommended by one or two writers for psoriasis, are very apt to cause eruptions of various types, which sometimes proceed to a universal exfoliation of the epidermis, or renal complications which may threaten life. On the whole they should not be administered without previous experience of their toxicity. Another group of drugs more dangerous perhaps because they can be obtained by the patient and taken by the mouth without medical supervision, are the soporifics and analgesics of the *barbituric series,* such as veronal, gardenal, dial, luminal, and allonal. While the fatalities from an overdose receive ample recognition in the coroners' courts, it does not seem to be generally known that they are not infrequently the cause of more or less irritable and widespread rashes, of an erythematous, scarlatiniform, urticarial or morbilliform type. An overdose is by no means a necessary precedent, individuals vary enormously in their susceptibility, and may have been taking medicinal doses of their pet sedative for years. The practitioner should always think of the possibility of a dermatitis medicamentosa whenever faced by a widespread eruption which he cannot place, especially if the patient is afebrile. The increasing use of the modern synthetic soporific will assuredly add to the number of such cases in the future.

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MODERN METHODS OF TREATMENT IN OTO-LARYNGOLOGY

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THERE have been many advances of recent years in the treatment of diseases of the ear, nose and throat, especially as regards the earlier diagnosis and the treatment of malignant disease in these regions, in common with the advances in the treatment of malignant disease elsewhere. But in some directions

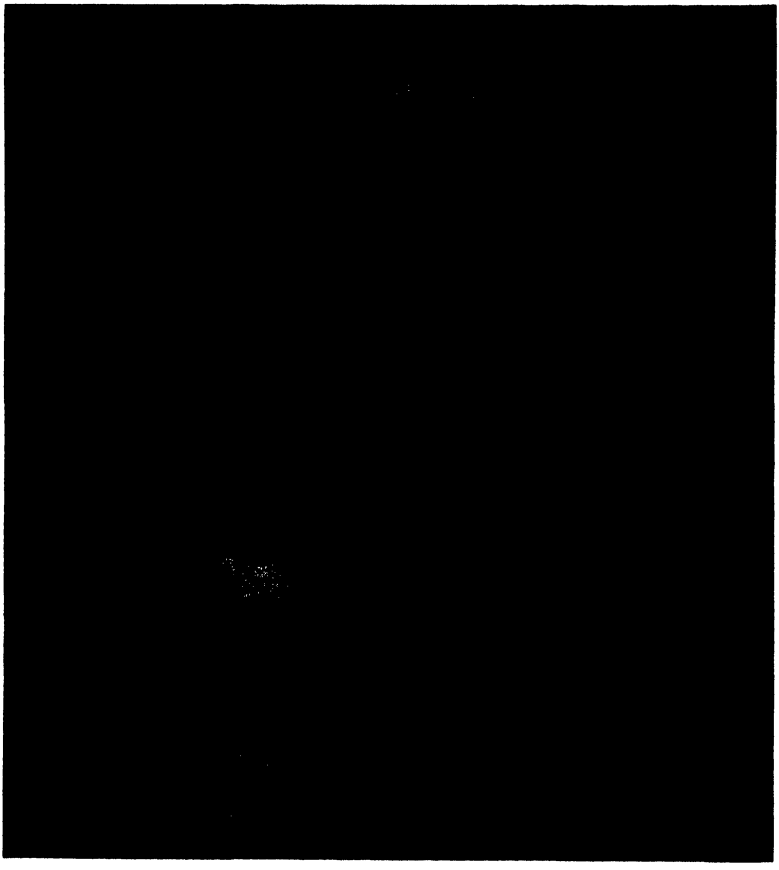

Fig. 1.—Carcinoma of œsophagus.

—such as in the treatment of chronic deafness and otosclerosis—the advance has been so slight as to be almost imperceptible, while in other directions—such as in the diagnosis and treatment of malignant disease of the œsophagus and of the nasal sinuses—the difficulty of making a diagnosis at a stage when the disease is still operable is so great that it is doubtful whether any advance will ever be made in treatment until the diagnosis of malignant disease can be made perhaps by biochemical or biophysical means. In cancer of the œsophagus even a routine examination of the food passages in every patient complaining of difficulty in swallowing would apparently bring little or no help.

Fig. 1 is an X-ray film of a man aged 55, who came to hospital complaining of some difficulty in swallowing for the previous three weeks. Examination of the nose, pharynx and larynx did not reveal anything abnormal, and, more as a demonstration to a colonial visitor than for any other reason, I kept him until the end of the clinic, took him to the operating theatre and passed an œsophagoscope after spraying the throat with 10 per cent. cocaine.

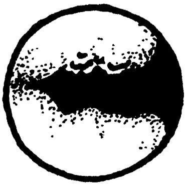

FIG. 2.

Fig. 2 shows the malignant growth, beginning to ulcerate, which was revealed at the level of the 4th dorsal vertebra, confirmed by the X-ray which was taken next day. Yet the history dated back three weeks only! It was thought that the case might be suitable for implantation of radium by thoracotomy, but the condition was even more advanced than was anticipated and he survived the operation 48 hours only.

There are, of course, several triumphant successes to the credit of surgery in the treatment of cancer of the œsophagus, but these cases (Torek, Eggers and Lilienthal) are apparently merely lucky ones. For palliative treatment radium, X-rays, diathermy, Souttar's tubes, and gastrostomy have all proved useful, but none of these is a true advance in treatment.

THE TREATMENT OF CANCER OF THE LARYNX

The consideration of the treatment of cancer of the larynx resolves itself into a comparison of the claims of the advocates of surgical operation, radium, and therapeutic X-rays. Douglas Harmer, in his Semon Lecture in 1931, reviewed the value of radiotherapy in the treatment of cancer of the upper air-passages and collected a list of 351 patients with cancer of the larynx who had been treated with radium (mostly by the fenestration technique); of these, 209 were dead and 116 living, 29 free from disease for 3 to 5 years or more. Of Harmer's own patients treated with radium the total numbered 47; of these 8 were early (operable, suitable for thyrotomy) cases, and of them 7 were alive and well, 2 for over 5 years, 1 for 5 years, and 1 for 3 years; 20 were borderline cases, of whom 8 were alive—1 for 5 years—and 11 dead (1 untraced); 19 were inoperable cases, of whom 3 were alive and 15 dead (1 untraced). The voice results in early cases, he states, are far superior to those that could be obtained by cutting operations, the worst voices being better than the average obtained by thyrotomy. He considers that radium is the best treatment for all cases; in early cases he points out that the percentage of cures would appear to be quite as high as with surgery, and in advanced cases there would seem to be no doubt that radium should always be tried before laryngectomy. Coutard treated 77 patients with cancer of the larynx with X-rays, with 32 per cent. of cures for 3 years and 21 per cent. for 8 years; and Halberstaedter treated 31 patients with X-rays, of whom 24 have improved and 7 are dead.

On the other hand, it should be remembered that Sir StClair Thomson has obtained 80 per cent. (in nearly a hundred cases) of permanent cures by the operation of laryngo-fissure in all his cases of intrinsic cancer of the larynx; even better results are obtainable from this operation when it is limited to cases in which the affected vocal cord is quite mobile and free from disease at either extremity.

It is probably true that in skilled hands the results of early intrinsic cancer of the larynx, whether treated by radium or surgical operation, are about the same, but that radium has yet to show permanent cures over as long periods as laryngo-fissure has done. In more advanced cancer of the larynx, suitable for laryngectomy but beyond the scope of laryngo-fissure, although laryngectomy in skilled hands undoubtedly has given good results so far as life is concerned, yet most surgeons now hesitate to recommend such a mutilating operation in preference to treatment by radium or X-rays, even although it has yet to be proved thât in such cases radium or X-rays can give such good results, as regards life, as laryngectomy.

The general practitioner must, however, concentrate on giving the surgeon earlier opportunities of treating the disease. It cannot too often be repeated that no patient should be allowed to have a hoarse voice for more than a month without being examined by a laryngologist. Also that an ear, nose and throat surgeon should make a routine examination of the larynx in every patient, whether he (or she) complains of laryngeal symptoms or not.

Only the week before writing this article a woman, aged 58, came to my out-patient clinic complaining of nasal catarrh. She was not deaf, her turbinals were hypertrophic, her frontal sinuses and maxillary antra were clear on transillumination; she had a reddened pharynx and post-nasal space and moderately enlarged tonsils. She was inclined to splutter on examination, and I very nearly prescribed some conservative treatment for the nose and throat and allowed her to go, but I forced myself to observe my own rule and examined, with some difficulty, her larynx—to find an epithelioma of the left vocal cord present; her voice was a little husky, but not markedly so.

Fig. 3 shows the appearance of the larynx in a man aged 63, who came to my hospital clinic with a note from his practitioner stating that he had been deaf for some years in his left ear and had now gone deaf in his right ear. The fact that the man had been hoarse for six months was not mentioned at all; but routine examination of the larynx revealed an epithelioma of the left vocal cord, fixed and too advanced for laryngo-fissure. It was treated with radium by the fenestration method.

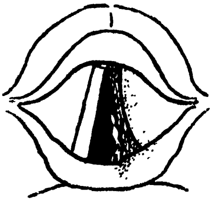

FIG. 3.—Carcinoma of larynx.

THE TREATMENT OF TUBERCULOSIS OF THE LARYNX

Tuberculosis of the larynx is a comparatively common complication of pulmonary tuberculosis and the prognosis of the lung condition is usually worse when the larynx is affected. It has been calculated that one out of every three cases of active pulmonary tuberculosis has a laryngeal lesion, and as there are 236,758 cases of pulmonary tuberculosis in England and Wales according to the last returns of notifications kept by medical officers of health, it follows that there are approximately 78,919 cases of tuberculosis of the larynx of greater or less degree in this country to-day.

The treatment of tuberculosis of the larynx is essentially that of the disease affecting the patient as a whole, as it is never primary but always secondary to tuberculosis of the lung. Every case of tuberculosis of the larynx is best treated in a sanatorium, and the mainstays of treatment are the sanatorium regime and rest to the voice by maintaining silence or speaking in a whisper. Many practitioners are over-optimistic about the duration of sanatorium treatment and tell their patients that they will be away in a sanatorium for about a month or six weeks. If the larynx is affected even in a slight degree the stay in a sanatorium will be for at least six months and may be considerably longer. Indeed, tuberculosis of the larynx must never be looked upon as " slight " and under the best circumstances a cure cannot be looked for in more than about

25 per cent. of cases—though even this is a very different percentage from that in 1880, when Morell Mackenzie said that it was doubtful if any case of tuberculosis of the larynx ever recovered.

As adjuvants of treatment by a stay in a sanatorium and vocal rest, the galvano-cautery, the application of chaulmoogra oil, and artificial sunlight generally or locally have all been enthusiastically advocated; but the tendency to-day is rather to emphasize the value of methods of treatment that will aid the laryngeal condition by putting the lung at rest, such as artificial pneumothorax and phrenic avulsion. Not every case of pulmonary tuberculosis is suitable for treatment by artificial pneumothorax, and by most authorities it has been considered to be unjustifiable to induce artificial pneumothorax without a preliminary trial of pure sanatorium treatment; but there is an inclination to-day to do so in an earlier type of case than has hitherto been usual. In artificial pneumothorax the pleural space of the affected or the more affected lung is inflated with air introduced through a needle, thus putting the lung at rest much as a splint would rest a tuberculous joint. In 1927 Sir StClair Thomson and R. R. Trail reported 9 cases of tuberculosis of the larynx treated by artificial pneumothorax, with complete healing in 6; and in 1930 J. P. Dworetzky collected a total of 56 cases similarly treated by 17 different physicians, with cure or arrest in 26 cases, including 9 cases of his own, 4 of which were cured and 5 improved. At the British Medical Association meeting in Dublin in 1933 I gave details (not yet published) of 40 cases of tuberculosis of the larynx under my observation in the London County Council tuberculosis sanatoriums, treated by artificial pneumothorax; in 26 cases the laryngeal condition was arrested or improved, in 8 the condition was stationary, in 5 it was worse, and there was one death. There were also 9 cases of tuberculosis of the larynx treated by phrenic avulsion and 2 by thoracoplasty, in all of which the laryngeal condition improved. It must, of course, be remembered when assessing the value of artificial pneumothorax and the other methods of lung collapse in tuberculosis of the larynx that all of my patients were at the same time under the sanatorium regime and treated by rest to the voice. Nevertheless, the value in tuberculosis of the larynx of artificial pneumothorax—which has been called the only advance in the treatment of pulmonary tuberculosis since the introduction of sanatorium treatment—must be acknowledged. Even more important, perhaps, is the general adoption in most modern sanatoriums of the routine examination of the larynx without waiting for laryngeal symptoms to appear, which allows of treatment being instituted at a much earlier stage of the disease than has been the case in the past.

THERAPEUTIC BRONCHOSCOPY

The fact that bronchoscopy is nowadays carried out almost universally under local anæsthesia (except in children, when a general anæsthetic is necessary unless in the skilled hands of a Chevalier Jackson), with or without a sedative, such as nembutal by mouth, enables this procedure to be employed freely both for diagnosis and treatment. It is a mistake to look upon bronchoscopy as a technique designed only for the extraction of foreign bodies from the trachea or bronchi; in Chevalier Jackson's clinic in Philadelphia less than 2 per cent. of the cases are foreign body cases and most of the bronchoscopies are done for the diagnosis and treatment of asthma, bronchiectasis, malignant diseases of the lung, and other chronic lung conditions. In fact, as Chevalier Jackson has said, the most important thing is to refrain from doing a bronchoscopy when it is contra-indicated; such contra-indications include purulent pneumonia, very extensive multiple abscess formation, extensive bronchiectasis (involving the greater part of a lung), and marked heart weakness.

In bronchiectasis cure is likely to be brought about only if bronchoscopic treatment is instituted early, but many comparatively advanced cases are greatly relieved by regular bronchoscopy and aspiration, even if they are not cured. A number of cases have been reported in which simple tumours or malignant growths have been removed from the bronchi or radium inserted by the aid of the bronchoscope, with apparent cure; but such cases are bound to be rare, and the bronchoscope is likely to be more useful in the diagnosis than the treatment of malignant disease of the lung.

So far as foreign bodies in the air—or food—passages are concerned, the important thing for the general practitioner to do is to realize that their presence is a possibility. Foreign bodies in the lung are overlooked either because the patient gives no history of a foreign body or if he gives such a history it is disbelieved or ridiculed by the practitioner. The possibility of a foreign body should be considered and excluded in every case of acute or chronic lung disease in a child. There is usually a symptomless interval after a foreign body is inhaled and then various diseases may be simulated, such as asthma, bronchitis, tuberculosis, pneumonia, or empyema. An "asthmatoid wheeze," heard at the patient's open mouth, may be pathognomonic, and there may be such symptoms as cough, blood-stained sputum, metallic taste or an unpleasant odour. The seriousness of a foreign body in the lung varies, for while some, especially vegetable foreign bodies such as beans, peas and peanuts, set up at once a very toxic type of bronchitis, and may prove fatal in children in a week or two, others, such as needles and other metallic objects, may remain for years in the lung without giving trouble, provided there is no obstruction. Obstructive foreign bodies cause atelectasis, drowned lung and eventually pulmonary abscess. The diagnosis is made by careful physical examination and by the X-rays; but both an artero-posterior and a lateral view of the lung must be taken. For example, Fig. 4 was sent along with the patient to hospital and clearly showed the presence of a foreign body (a screw) in the lung; but it could not be located until Fig. 5 had also been taken, when it was found that the foreign body was much more towards the base of the lung than would be imagined in looking at Fig. 4.

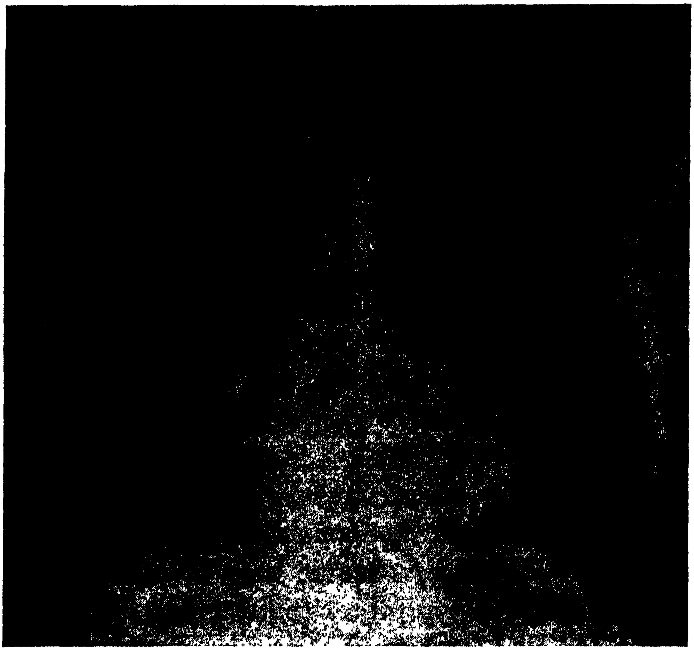

FIG. 4.—Foreign body (screw) in the lung.

THE TREATMENT OF NASAL SINUS SUPPURATION

Although the importance of nasal sinus suppuration as the possible cause of chronic lung disease, some mental disorders, and various types of unaccountable ill-health is now well recognized, it is still too frequently overlooked. Of the last six cases of nasal sinus suppuration that have been under my care two had been called cases of "neurosis," one "hay fever" (although it was August), one "pulmonary tuberculosis" (because of loss of weight and a persistent cough), and the other two "nasal catarrh" (although the "catarrh" was one-sided). Transillumination of the nasal sinuses is a simple procedure with the inexpensive electrical instruments that are available nowadays and should be carried out in every case when nasal symptoms are complained of. It is not always accurate, however, and in doubtful cases should be supplemented by X-ray examination or by washing out

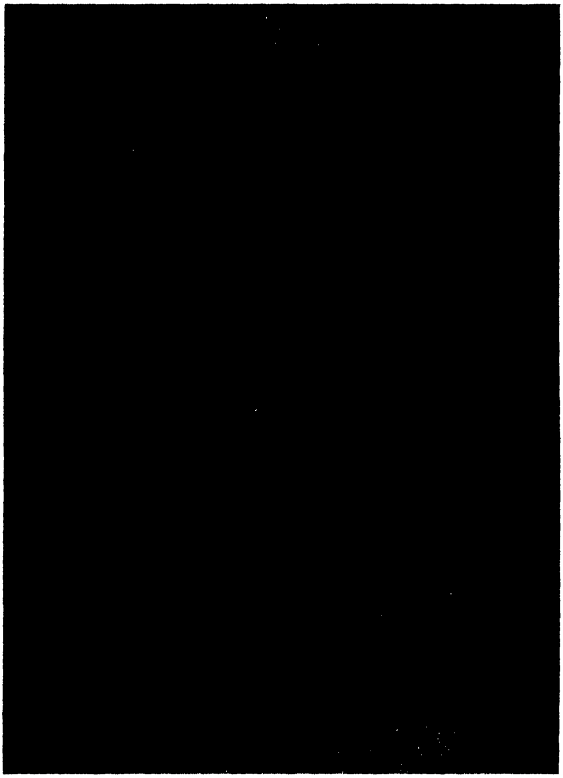

FIG. 5.—Lateral view of case in Fig. 4.

a suspected maxillary antrum with Lichtwitz's trocar and cannula.

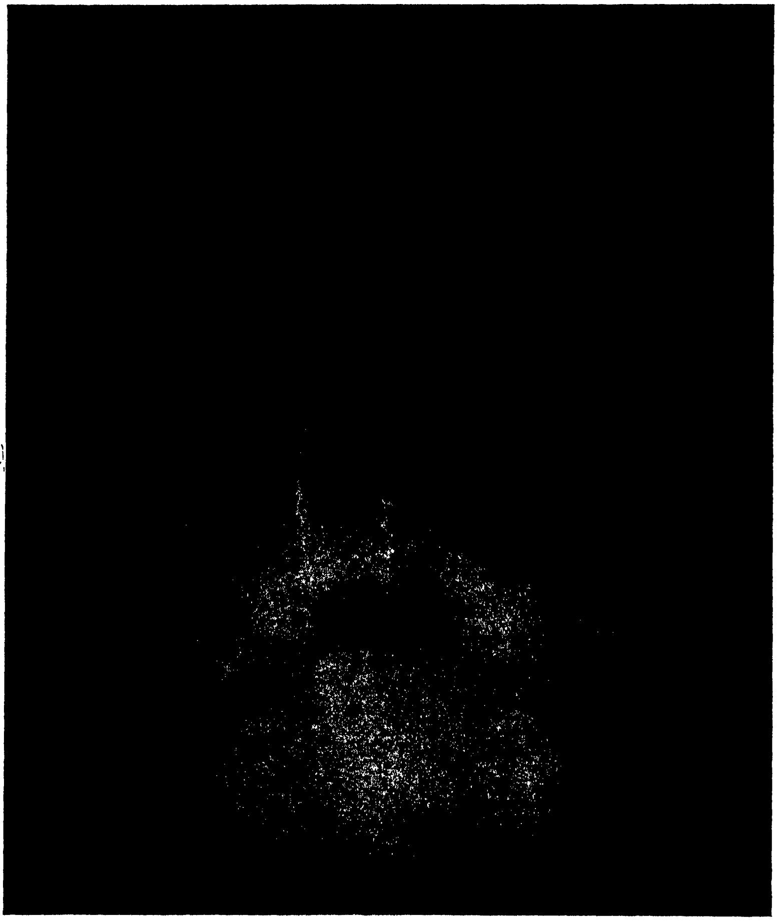

Fig. 6.—Empyema of right antrum.

Fig. 6 illustrates the case of a lady whose symptoms of general ill-health had for years been attributed to neurasthenia. She was sent to me because of " nasal catarrh " and in the course of a routine examination transillumination of the frontal sinuses and the maxillary antrum showed them all equally clear. There was, however, a trickle of pus far back in the right side of the nose, and I had her X-rayed as a precautionary measure, in case I was overlooking a sphenoidal or posterior ethmoidal suppuration. To my surprise, the X-ray films revealed only the right antrum as affected. This was then washed out and found to be full of foul pus. A radical operation was followed by the disappearance of her symptoms of neurasthenia.

While cases of long-standing sinus suppuration require radical operation, more recent cases and cases of catarrhal sinusitis may clear up by employing conservative measures. It is impossible, however, to introduce any medicament into the nasal sinuses by means of sprays or douches, and here a considerable advance has been made by using the displacement method of Proetz, by which any fluid can be introduced into the sinuses with ease. The displacement method is based on the fact that if a liquid be introduced into a cavity so as completely to submerge the mouth of another cavity opening into it, and suction be applied to the first cavity and any other openings closed, the air in the second cavity will be sucked out and the fluid will flow in to take its place. The method is carried out as follows:—(1) The patient's head is inverted so that the chin and external auditory meatuses are in the same vertical plane. (2) Fluid is instilled into the nose. (3) Negative pressure (180 mm.) is applied intermittently to one nostril, while a finger closes the other and the patient closes the pharynx by saying "K." (4) The patient is returned to the erect position. The time required is approximately one minute, and the fluid so instilled will remain in the sinuses for from 24 to 96 hours or longer. The fluids and secretions from the nose do not penetrate into the Eustachian tube, as might be imagined, because the pharyngeal end of the tube is normally in a collapsed state.

This method will be found an excellent one for cleansing the mucosa of the nasal sinuses, loosening inspissated secretions and diluting others, and bringing about drainage of infected sinuses, provided the natural ostia are patent and the mucosa not polypoid. It cannot take the place of surgery in chronic cases where radical treatment is indicated. Proetz recommends ephedrine sulphate 0·5 per cent. in physiological saline (distilled water is distinctly irritating to the mucosa) for routine displacements, but I have found argyrol in 5 to 10 per cent. solutions the most effective, as it is non-toxic and non-irritating and, unlike some other antiseptics, is able to remain in the sinuses for comparatively long periods without disintegrating and liberating irritating substances.

ANÆSTHESIA IN NOSE AND THROAT OPERATIONS

Operations on the ear are almost always performed under general anæsthesia, but the practice of different surgeons (and, indeed, of different countries) varies with regard to anæsthesia in operations on the nose and throat. Emil Mayer, of New York, says that he has met but one operator among many hundreds interviewed who stated that he invariably used general anæsthesia in throat and nose operations, and in America local anæsthesia is always looked upon as the anæsthesia of choice in these operations, except in children, when general anæsthesia is preferred. In London the percentage of nose and throat operations performed under local anæsthesia rather than general is less than in the rest of this country, probably because the number of anæsthetists skilled in giving general anæsthetics for nose and throat operations is greater. For general anæsthesia in nose and throat operations has problems peculiarly its own; the anæsthesia must in throat cases be deep enough for the pharyngeal reflexes to be abolished, yet the patient should be able to regain a cough reflex soon after the operation is over; the field of operation is the same as the route for the anæsthetic, and the operator has often the unpleasant experience, particularly when ether is being given, of getting nearly as much of the anæsthetic as the patient.

Advances in anæsthesia of recent years have been mainly in the direction of lessening the unnecessary fears of the patient by pre-operative medication; basal hypnotics are employed which not only lessen the pre-operative fears of the patient but lessen the amount of anæsthetic necessary during the operation, and gas and oxygen is often a sufficient anæsthetic to take the place of the more toxic chloroform or ether. Avertin, which is the most popular basal hypnotic to-day, is in my opinion not well suited for nose and throat cases, as one does not want the patient to lie fast asleep, with the cough reflex abolished, for some hours after the operation. I have used nembutal, three grains (two capsules), by the mouth, one hour before the operation, for the past two years for pre-operative medication, and have found it very useful, followed usually by ether or ether and chloroform; sometimes restlessness has been rather marked during the recovery period, but this has always been controlled by a hypodermic injection of morphine. The value of nembutal in abolishing psychical trauma has been very marked; few of the patients have been actually asleep before ether was begun, but, with one or two rare exceptions, all were in a pleasantly comatose state and had no recollection afterwards of being brought to the operating theatre or of the general anæsthetic being given.

Recently I have been employing evipan sodium intravenously as a routine general anæsthetic in adults, and although up to the present I have had only some 45 cases, I am prepared to greet this drug as a great advance in nose and throat anæsthesia. Like nembutal it is a barbituric acid derivative, and it is characterized by the rapid onset, depth, and short duration of its anæsthetic action; moreover, it is a safe anæsthetic, in that animal experiments have proved that there is a very wide margin between the anæsthetic dose and the lethal dose.

The German experience of evipan now extends to over 25,000 cases, and the Anæsthetics Committee of the Medical Research Council has published a report favourable, within limits, to evipan, though it pointed out that its action was evanescent and that it could not be regarded as a basal narcotic in the sense that, for example, nembutal and avertin were. Following the example of R. Jarman and A. Lawrence Abel I have been employing omnopon and scopolamine as pre-medication to evipan, with successful results. Two-thirds of a grain of omnopon with $\frac{1}{150}$ grain scopolamine are given one hour before the operation; the patient is usually sleepy but not asleep when he is brought into the operating theatre, and evipan solution is then given intravenously into the median vein, the patient counting until he goes off to sleep, which is usually in less than a minute. The evipan sodium is prepared as a powder in an ampoule containing one gram; with the ampoule is issued another ampoule containing 10 c.cm. of distilled water, and the powder in the ampoule is dissolved by adding the distilled water by means of a syringe and then aspirating and re-injecting it once or twice. The solution is run into the vein very slowly, and about 3 c.cm. will usually produce unconsciousness. For nose and throat operations I have been accustomed to use 10 to 15 c.cm., and in one case of a large, stout soldier I used 28 c.cm. before complete unconsciousness and the abolition of the pharyngeal reflexes were produced, without any ill-effects afterwards. By employing an intravenous anæsthetic the whole problem disappears of the anæsthetic route being the field of operation, and no longer does the ether or chloroform blow unpleasantly into the operator's face. In addition, in none of my cases has the patient complained of sickness afterwards; one or two patients vomited slightly while they were still under the effects of the anæsthetic, but knew nothing about it. In every case the patient has said that he (or she) woke up out of the anæsthetic as if from sleep, without headache, nausea or restlessness, and no patient has had any unpleasant recollection of the induction of anæsthesia. My cases have included dissections of tonsils, submucous resections of the nasal septum, radical antrum, radical ethmoid and frontal sinus operations; the longest duration of an operation has, however, been 40 minutes, and evipan may not prove so useful in longer operations.

THE USES OF RADIUM

By ROY WARD, M.B., M.R.C.S.

Medical Director, Radium Institute.

THE gradual increase of knowledge, both of the action of radium and of the behaviour of many types of malignant disease under its influence, has now reached a point where it is possible to make more definite statements in regard to the results to be expected from the radium treatment of certain diseases. Before the advent of radiation, the treatment of malignant disease was largely surgical, but the position has altered, and at the present time there are types of cancer which are treated preferably by radium. It must be urged at once, however, that it is essential that the two methods should not be divorced. They resemble each other in that their effects are local, and that they are used to combat a disease which frequently becomes general. Surgery and radiation must not be regarded as methods which are poles apart, and there never was a time when it was more necessary to use every means at our disposal to deal with this deadly disease. In this short summary on the uses of radium, it is necessary to realize its relation with surgery, since it is now possible to distinguish more clearly those conditions which should be treated by radium, those in which surgery should be used, and those in which a combination of the two is the best method of treatment.

Radium therapy can be regarded as the method of choice in the following seven groups of malignant disease:—(1) Epithelioma of the skin. (2) Growths of the mouth and upper air-passages. (3) Carcinoma of the cervix uteri. (4) Some cases of carcinoma of the breast. (5) A large number of sarcomas. (6) Certain conditions of the eye and its appendages. (7) The value of radium as a palliative measure in many cases of malignant disease is sometimes overlooked, but is none the less extremely important. (8) The uses of radium in various benign conditions, although not so widely known, form an important part of the subject. The lesions for which radium is used include papilloma, keratosis, keloid, lupus vulgaris, angioma, tuberculous adenitis, leukæmia, lymphadenoma, uterine hæmorrhage. Before discussing these groups in detail, it will be of advantage to outline briefly the main methods used in treatment by radium.

METHODS OF RADIATION

There are two main methods of radiating a growth. Radium may be applied interstitially by means of needles or seeds, or to the surface of the overlying skin or mucous membrane by various forms of apparatus. The special applicators used in cavities include dental moulds containing radium and various kinds of tubes for use in the uterus, vagina, rectum and œsophagus. Large moulded plaques for external use are made of various thicknesses, the skin focal distance varying from 1 to 5 cm. Another method of external radiation is termed " Mass radiation " or " Beam therapy," in which a large quantity of radium—at least one gram—is used as a single unit. Mass radiation from radium and deep X-rays are the only radiological methods at present available for treating deep-seated tumours which are not suitable for interstitial radium and which cannot be irradiated adequately with surface plaques at short distances from the skin. In this way it is possible to obtain deep penetration, and by using multiple ports of entry a depth dose can be delivered which is more intense and more homogeneous than is possible by any other radiological method at present available.

Each method has its place in radium therapy and the technique employed depends on the type of case, on the apparatus available and on the object for which treatment is being given—whether cure or palliation. In the inoperable group of cases it is most important to decide before treatment whether a cure can be expected or whether palliative relief is all that is possible. Radium treatment is by no means free from discomfort, either during the treatment or for some time afterwards. If a cure can be expected, then a great deal of discomfort is justifiable if it is thought that by this means only is a cure possible. On the other hand, if a patient has but a few months to live, any palliative treatment must be undertaken with care, as increased discomfort is unjustified if it is out of all proportion to the amount of benefit which is likely to be obtained.

(1) *Epitheliomas of the skin.*—It has been known for many years that radium has a powerful effect on epidermoid cancer, and that it has certain advantages over surgery and X-rays. Most cases of rodent ulcer can be cured by it, and from a cosmetic point of view the results are superior to those obtained by any other method. Rodent ulcers are divided into three main groups—hypertrophic, flat and deeply ulcerative. Small lesions of the first two varieties are treated in the outpatient department by radium plaques. Beta radiation is used, a short unscreened exposure being given, and the patient is able to continue his usual occupation during the reaction period. For the larger growths, gamma radiation must be used either in the form of surface or of interstitial radiation. In a series of 1,773 cases treated at the Radium Institute, the following results were obtained in each group :—

Hypertrophic - -	91 per cent.
Flat - - - -	77 per cent.
Deeply ulcerative -	38 per cent.
All cases - - -	77 per cent.

In carcinoma of the lip, radium therapy has produced results which compare favourably with those of surgery, and because secondary involvement of cervical glands takes place comparatively late in the disease, a high percentage can be cured.

Carcinoma of the anal canal, in common with other epidermoid cancers, is sensitive to radiation, and colostomy can be avoided in most cases. Interstitial radiation gives good results, and, if treatment is undertaken before the glands are involved, the prognosis is good. During the last few years it has been shown that certain cases of epithelioma of the penis have responded well to radium, but it must be understood that all cases are not suitable. Those growths in which there is marked surrounding infiltration, and in which invasion of the substance of the organ has taken place, cannot be cured by radium. On the other hand, hypertrophic growths, even when extensive, respond readily. Cases must be chosen with care, and in the event of an unsatisfactory result after radium, amputation should be performed.

Radium is the method of choice in most cases of epithelioma of the vulva. There is a wider margin of safety between the radio-sensitivity of the growth and the surrounding tissues in this condition than in carcinoma of the penis. Great care is necessary to avoid overdosage and at the same time to give an exposure of sufficient intensity to bring about complete disappearance. Satisfactory healing of primary growths in these sites is obtained in a large number of cases. But, as is the case in mouth cancer, the obstacle in the way of absolute cure is the lack of any efficient form of treatment for the regional glands when they have become involved. The frequency with which this involvement is bilateral only adds to the difficulties of treatment.

(2) *Growths of the mouth and upper air passages.*—In cases of mouth cancer, the treatment of the primary growth has been revolutionized during the last few

years by the introduction of interstitial radiation. There can be no doubt at the present time that, with the exception of very small growths near the tip of the tongue, in which diathermy is equally successful, radium is the best method, and that the primary growth can, in the majority of cases, be made to disappear permanently by radium therapy. Growths affecting the floor of the mouth, lower jaw, cheek, tonsil, palate, upper jaw and nose, vary both in their degrees of malignancy and radio-sensitivity. Some are treated with radium alone, either interstitially or with a dental mould, while in others radium treatment is supplemented by diathermy excision.

It has been pointed out by Trotter that radium has given us a new and powerful addition to our means of attack in the treatment of epithelioma of the pharynx, but so far from simplifying the attack it has made it more than ever dependent on experienced judgment and expert handling. With few exceptions, these growths are inoperable when first seen, and radium therapy has become the most important method of treatment, owing to the temporary relief which follows. These growths are so inaccessible for local applications of radium, and at the same time all methods are attended by such risks from sepsis and necrosis, that future progress in treatment is likely to be made by the use of mass radiation, or beam therapy as it has recently been called in this country. In Stockholm, Berven is getting better primary results than anyone else by using beam therapy for cancers of the tonsil and hypopharynx. He has obtained a number of three-year cures, and hopes by improving his technique to obtain still better results.

Regional glands.—The treatment of the glandular areas in the neck still remains a most complicated problem. Surgery and radium have their exponents, while there are others who believe that radiation should always follow operation. The surgical technique of a block dissection of the glands in the neck is such that the operation should be done only by those who are expert in this branch of surgery. The five-year survival rate after operation alone is so low that one is forced to the conclusion that adequate irradiation is better than incomplete operation. Incomplete operations on the neck are not only useless, but excision of individual glands is likely to lead to wider dissemination and rapid growth.

(3) *Carcinoma of the cervix uteri.*—Radium therapy has done more in cases of carcinoma of the cervix to alleviate symptoms and prolong life than in any other group of cancer patients. Originally, only inoperable cases were treated. As techniques improved operable cases were treated, and with increased accuracy of dosage and prolongation of the time factor in treatment, results became more encouraging. Wertheim's operation is still performed for early cases, and in the hands of the most expert operators gives good results. Nevertheless, the operation has a high operative mortality—16·4 per cent. in the most skilled hands—so high as to appear out of all proportion to an absolute five-year cure rate of 23·4 per cent.

It has been argued that the chief advantage of Wertheim's operation over radium therapy is that it holds out a definite chance of permanent cure when the regional glands are involved, whereas it is believed that absolute cure is beyond the scope of radium in these cases. Recently, the use of X-rays as an adjunct to radium therapy has still further increased the number of cures, until to-day most gynæcologists are of the opinion that radium should replace surgery. Only a few radium clinics have a sufficiently large number of early cases to compare with the statistics of the leading surgical clinics. The largest sample comes from the Radiumhemmet, Stockholm. Between 1918 and 1922, 457 cases were treated; of these, 289 were treated with radium alone, with 21·8 per cent. five-year cures, 168 cases were given combined treatment with X-rays and radium, with 29·2 per cent. cures; so that the combined treatment appears to have brought about better results both in the inoperable and in the operable cases.

In cases of cancer of the body of the uterus, it is still doubtful whether surgery or radiation is the method of choice. Recently statistics have been published from Stockholm and other clinics which show results that compare favourably with surgery. There is no doubt, however, that when the disease is limited to the uterus, operative treatment produces a high percentage of cures and the mortality is low—in striking contrast with the surgical aspect of carcinoma of the cervix.

(4) *Carcinoma of the breast.*—In spite of the favourable results obtained in inoperable carcinoma of the breast, the choice of treatment in early operable cases has not yet been placed on a satisfactory basis. At the Radium Institute, treatment in only undertaken in those early cases in which the breast is thin and flat, and in which the tumour is well defined. In this type of case radium has many advantages over surgery, whereas in large pendulous breasts containing much adipose tissue, it is not only difficult to arrange needles with accuracy so as to insure a homogeneous radiation, but operation has definite advantages. A radical operation can be performed with excision of a wide area of skin, and the results following such treatment are very good. It may be argued that local excision of the breast combined with radiation to the glandular areas should be just as satisfactory as the radical operation in those cases where the disease is limited to the breast. On the other hand, the removal of the axillary contents does not add appreciably to the risk of the operation, and local excision is open to the serious objection that

the lymph paths, along which excision takes place, are cut across.

It would appear, therefore, that local amputation has no place in the treatment of breast cancer as a primary surgical procedure, although a limited operation may sometimes be advisable after radium treatment. In the inoperable groups, surgery is relieved of the responsibility of attempting to perform operations which are invariably unsuccessful. The practice of removing as much of the growth as possible is usually a disastrous procedure, which only stimulates the growth to greater activity, and encourages further metastases. Radium will often arrest the progress of the disease for many years, even in advanced cases. Fungating growths and ulcerated areas may heal completely, and remain healed. When there are fixed masses in the axilla, or the supraclavicular glands are invaded, the patient cannot be cured by excising them, and such metastases should be treated with radium alone.

(5) *Sarcomas.*—It is difficult to discuss the treatment of sarcomas in general because of their wide variation in radio-sensitivity and ease of access from a surgical point of view. In cases in which radio-sensitivity is well marked, and where, at the same time, complete removal is impossible, the problem of treatment is solved at the outset. In this group may be included lymphosarcoma in glands and sarcomas of the upper air passages, and radiation therapy is the method of choice. In osteogenetic sarcoma, on the other hand, the problem is a more difficult one. It is possible, in this group, by means of high amputation in the case of the long bones, and by extirpation of the superior maxilla in the case of the antrum, to remove the disease completely. The results of surgery, however, have been far from encouraging, and radiation therapy has been tried in a large number of cases. In the case of sarcoma

of the upper jaw, encouraging results have been attained, but in the long bones most sarcomas have proved so radio-resistant that the question of the choice of treatment is a complicated one.

In yet a third group, the fibro-sarcomata, arising in muscle and connective tissue, treatment is still more unsatisfactory, for not only is operation impossible in the majority of cases, but radiation therapy has not hitherto given good results. This does not mean that radiation therapy should not be given. These growths are not so liable to form metastases, and in those cases where the radio-sensitivity is sufficiently marked to bring about the sterilization of the tumour as a result of several applications, a good result may be obtained. In the melanotic group, radiation treatment almost always fails, so that a wide excision is to be preferred in all cases. At the Radiumhemmet, Stockholm, the sarcoma group as a whole is treated mainly with X-rays, although more recently, radium at a distance, using a 3-gram unit, has taken a prominent part, especially in sarcoma of the tonsil, where it is used almost exclusively.

(6) *Diseases of the eye.*—The conditions for which radium is successfully used are superficial and include lesions of the eyelids, cornea and conjunctiva. These are conditions in which great penetration is not required and where it is desirable, and at the same time possible, to limit the zone of irradiation. Tumours affecting the conjunctiva and cornea are often difficult of diagnosis and, if when first seen they are still superficial, radium treatment is worth a trial. Since the full effect of treatment, and therefore the susceptibility of the tumour to radiation, can be assessed at the end of six to eight weeks, little time is lost and the reaction of many of these tumours is so satisfactory that operative procedures can often be avoided by this means. Retrobulbar tumours, choroid sarcoma, and other tumours growing from the more inaccessible

parts of the orbit, are not suitable for radium treatment as a primary measure. In most cases, exenteration of the orbital cavity is necessary. Where possible, this should be followed by a prolonged gamma radiation of the affected region as a prophylactic measure.

(7) *Radium as a palliative measure.*—The widest province of radium therapy is its use as a palliative measure, and there is no doubt that it has done more to relieve symptoms and prolong life in advanced cases than any other method of treatment. Cancer of the mouth and fauces, in cases which are inoperable can, if care is taken, be treated so that foul ulcers heal and dysphagia is relieved, the patient dying of secondary deposits and being saved from the miserable death which must otherwise be his lot. The offensive discharge and profuse bleeding in advanced cases of carcinoma of the cervix uteri can be stopped or diminished, and the patient's general condition is almost always improved. Fungating carcinoma of the breast can often be healed. The pain and foul discharge ceases, and the patient dies a more comfortable death from secondary deposits at a later date. As a palliative measure in cases of carcinoma of the rectum, radium is valuable, particularly in the lower ampullary growths. Hæmorrhage and discharge often cease, and the progress of the disease may become arrested for months, or even years, so that patients are kept comfortable and colostomy is avoided in many cases. The outlook in the treatment of carcinoma of the œsophagus, although still not encouraging, has improved somewhat since the advent of radium therapy, but the difficulties of access and of early diagnosis are not readily overcome. Enough work has been done on cases of carcinoma of the bladder to say that many patients have been given valuable palliative relief by means of radium therapy. There has followed relief from pain and hæmorrhage, sometimes for prolonged periods. Some cases of carcinoma of the

prostate have improved for a time after radium treatment, the mass becoming reduced in size and the urinary symptoms alleviated. The problem of treatment in this, as in many other conditions, is complicated by the difficulty of approach and of the accurate application of radium. With an increasing knowledge of mass radiation, it should be possible to control the disease for longer periods, as it is possible by this means to give a more homogeneous dose over a wider field, and at the same time to avoid local trauma.

(8) *Benign conditions.*—In addition to the above malignant diseases, there are a number of benign conditions in which radium therapy has proved beneficial. Most papillomas and keratoses of the skin can be successfully destroyed by an unscreened exposure of radium. Papillomas of the sole of the foot are most painful and troublesome, and the papilloma of the helix of the ear causes an amount of discomfort out of all proportion to its size. Pitch warts are very common in creosote and pitch workers. They occur commonly on the face and hands and are very susceptible to radium treatment.

The treatment of keloids is a matter of some importance from a cosmetic point of view, since they invariably recur if they are excised. After radium treatment most keloidal growths become flattened and pale, leaving a soft scar which in many cases is hardly visible. With the diminution of the keloidal tissue there follows relief from the pain and itching which often causes the patient a great deal of discomfort.

Patches of lupus, even if they have proved resistant to other methods, often respond well to radium. Isolated patches are treated with unscreened or lightly screened plaques. Such an exposure produces a destructive reaction of a moderate degree, which is followed by the formation of a smooth supple scar. With repeated exposures the affected area of skin becomes soft, and sometimes almost normal in appearance, although the scar tissue is usually pale.

There is no doubt that radium treatment gives better results than the use of any other method in cavernous angioma. It is sensitive to radiation in small doses, so that it is easy to avoid damage to the skin, while at the same time producing subsidence of the tumour. An important factor in treatment is that it should be started as early as possible, preferably during the first few weeks of life. The majority of cases do well although improvement is slow, and it may take many months, or even years, for the larger nævi to disappear. Radium treatment has no appreciable effect on stellate and petechial nævi, which are best treated by destroying the central vessels with an electro-cautery needle. Capillary nævi do not respond so readily to radium, and the results are variable. In those which do not respond, much can be done by means of ultra-violet light, more particularly in the port wine variety which does not react well to radiation alone.

The operation for the removal of tuberculous glands is now seldom performed, and X-rays and radium are used much more than formerly. In myelogenous leukæmia, it is possible with a surface application of radium to the splenic area to cause a decrease, not only in the total number of leucocytes but also in the number of immature and abnormal cells, so that the blood picture tends to approach the normal. In spite of the marked improvement in the blood which may follow, the characteristic features in the count are still present, but to a less marked degree. Symptoms are relieved, and the general health improves, so that from a palliative point of view the method is useful. Lymphadenoma is so sensitive to radiation that it is possible to bring about the disappearance of a mass of glands with a very small dose of radium. Even when the deep-seated mediastinal glands are affected it is possible to cause their regression to such an extent as to alleviate pressure symptoms. That applications of radium can cause the cessation of uterine hæmorrhage with great ease is an established fact. Radium therapy has a definite place in the treatment of uterine hæmorrhage, not only when the symptom arises as the result of menopausal changes, but also in other conditions of menorrhagia which are not dependent on gross lesions. An intra-uterine application is given, preferably under an anæsthetic, in order that a thorough bimanual examination can be made, and curettage performed if necessary.

RADIUM CENTRES

It has been said that radium is the most potent and dangerous of all substances known to man. Although this may seem an alarming statement and one that is somewhat unwarranted, it is nevertheless true that, until methods become standardized, radium treatment should only be undertaken by specialists at centres equipped for the purpose. The only possible exception is carcinoma of the cervix uteri, in which techniques and dosage have become so standardized that treatment can be undertaken in a routine manner by gynæcologists who have not had special training in radium therapy. It is of the highest importance that the medical practitioner should recognize those conditions in which radium is useful, but it is unwise for him to undertake radium treatment, unless he has had some special training in this highly specialized branch of medicine.

PRELIMINARY TREATMENT

A knowledge of the methods of treatment is essential to the practitioner so that he can co-operate in the preliminary treatment and post-operative care of his patient. If it is possible for adequate preliminary treatment to be undertaken while the patient is awaiting admission to hospital, a great deal of time can be saved and the patient's stay in the hospital thereby shortened.

Infection is an important factor in reducing radiosensitivity. The reasons for this are not definitely known, but radiation increases the inflammation, and the effect of treatment on an infected growth is often to induce a " flare-up " without appreciable effect on the tumour itself. So marked is this reduction of sensitivity in the presence of sepsis, that every effort should be made to reduce it before treatment begins. In cases of carcinoma of the cervix, for instance, much is gained by preliminary local treatment in grossly infected growths. The patient should be kept under observation and any pyrexia noted. Douches of four to six pints should be given twice a day. If a blood count shows a marked anæmia, every attempt should be made to improve the general condition. In buccal carcinoma the importance of making the mouth as clean as possible will be readily understood, especially when it is realized that carcinoma of the tongue is usually treated with radium needles. Septic and carious teeth should be removed, and every effort made to reduce the infection in association with a malignant ulcer by frequent irrigation or mouth washes. In those patients in whom a positive Wassermann test is obtained, anti-syphilitic treatment should be started at once while the patient is undergoing preliminary treatment.

POST-RADIATION CARE

Owing to the long latent period following radium therapy, the full therapeutic effect of treatment is rarely seen until two months after treatment. During that time certain local tissue changes take place, and when large areas have been irradiated this, in turn, affects the patient's general health. There may be some general lassitude and anorexia, which in some patients may last several weeks; in others, when large highly cellular tumours are resolving rapidly, the constitutional disturbance may be considerable. Locally there is usually some transient œdema of the skin about a week after treatment has been completed. In a further week, a well-marked erythema develops, followed by vesication and even superficial ulceration in those cases where an intensive irradiation has been given. This local condition does not subside, as a rule, for six to eight weeks. During this time a soothing local dressing must be used, and in this connection, cold cream, white vaseline and liquid paraffin have been found most useful. A comparable reaction is seen on the mucous membrane of the mouth and upper air passages. During the week following treatment there is usually œdema and inflammation, while the induration around the growth steadily diminishes. Later, the tongue becomes coated with a yellowish diphtheroid membrane, under which healing takes place. During this time—about eight weeks—the mouth should be irrigated at least six times a day with a weak solution of glycothymoline, Condy's fluid, bicarbonate of sodium, or dettol. The more powerful antiseptic mouth washes, such as carbolic acid, should be avoided. The care of the mouth is most important in these cases. Anything which is likely to irritate the inflamed mucous membrane, such as smoking and the use of condiments and sauces, must be avoided.

The after-care of carcinoma of the cervix should be undertaken on the same general principles. Local irrigations are most important, particularly during the first month after radium treatment. If efficient douching is not undertaken, an adhesive vaginitis will form in the upper half of the vagina. This is a great handicap in subsequent examinations. It is more difficult either to see or palpate the cervix in such cases, and this may give rise to uncertainty in deciding whether or not active disease is present.

REMOVAL OF RADON SEEDS

In cases in which radon seeds have been inserted into superficial lesions for a period of days, it is sometimes convenient for the patient to leave hospital before they are removed and for his practitioner to remove them. It is important that they should be removed on the day, and at the time, suggested. Each seed has a thread attached, and can, as a rule, be removed easily by gentle traction on the thread. In lesions of the skin, the threads are usually covered by a dressing of collodion, and this should on no account be disturbed until the seeds are removed, otherwise they may be displaced. In cases where difficulty is encountered and a seed is left in the tissue, this should be reported to the radium centre.

"FOLLOW-UP" OF CASES

The necessity of tracing the subsequent history of all cancer patients is too obvious to be stressed, and at the Radium Institute it has been found possible to keep in touch with over 90 per cent. of all cases through the medium either of a doctor, of the patient himself, or of his relatives. In following up cases, the patient's practitioner is written to every three months, when it is not easy for the patient to attend on account of distance. If the practitioner's report is satisfactory, a note is made to that effect, and it may not be out of place here to emphasize the importance and value of the doctor's report, in the case of those patients who cannot be seen at the radium centre. Such information cannot be too detailed, and an accurate description of both local and general conditions is invaluable. Co-operation between practitioner and the radium centre concerned is essential in the interests of the patient, but, further than that, it is impossible for the centre to achieve good results without it.

MODERN METHODS OF ELECTRICAL TREATMENT

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THIS article is written for the general practitioner in order to show the value of electrical treatment as practised at the present day, to give the reasons for its usefulness, and to indicate the part which he can play in electrotherapy. Electrotherapy is not entirely a modern form of treatment. With the exception of those oscillating with enormously high frequency, the currents now used were originally employed for medical purposes before the present century. The qualification "modern" when applied to electrical methods of treatment is intended to signify that they are employed scientifically, that is, with knowledge of their effects on pathological states and the ways in which these effects are brought about. This knowledge did not exist before 1900, and electricity was employed empirically and for diseases for which it was unsuitable. Quacks flourished and the profession reserved it for the helpless and hopeless cases which they wanted to get rid of.

Although much still remains to be discovered we now possess sufficient knowledge to make electrical treatment relatively scientific. Thus employed the treatment is *modern.* When disease fails to respond, or is unlikely to respond, to the simplest forms of treatment, such as internal or external medication, or to those simple forms of thermotherapy which the patient can apply himself, such as hot-water bags and poultices, the practitioner will want to know if any of the various forms of physical therapy are likely to be effective. A certain amount of information on the subject can be found in books on general treatment, but difficulty arises when more than one form of physical treatment is mentioned for the same disease. For this reason it would not be sufficient in an article dealing with electrical treatment merely to give a list of maladies with a statement of the results that may be expected from this form of treatment. A number of these maladies would be found in the lists compiled by specialists in other forms of physical therapy, especially diseases such as arthritis, fibrositis, neuritis, and sciatica, which provide so many cases difficult to treat satisfactorily by simple methods.

For these reasons the best way of showing the value of present-day electrical methods appears to be a preliminary description of the ways in which they act in the treatment of disease and contrast them with the methods of action of the other physical and non-physical remedies that may be recommended for the same malady. It will, then, be more easy to realize what electricity has to offer. If the value of electrotherapy, in comparison with other forms of treatment, physical as well as non-physical, could be assessed in terms of the final therapeutic results the difficulties in the way of selection would diminish or disappear. But until physical therapy has been standardized in all its branches the proper field for each one cannot satisfactorily be defined. And until team-work is established it will be difficult to say when physical therapy should be the treatment of choice, or when one form of this treatment should be replaced by another, or when they should be used in combination.

In treating disease or injury, electricity acts in one of three ways : (1) by heating the tissues; (2) by producing chemical changes in them; and (3) by stimulating muscle and nerve. Certain advantages are gained if electricity is chosen for producing these effects. They are as follows : (1) when electricity is used as a thermotherapeutic agent it can raise the temperature of parts which are too deeply situated to be reached by heat applied externally. An electric current is passed through the tissues. It produces heat by overcoming their resistance. The heat is generated in the superficial and deep tissues alike. In other words, diathermy is produced. The current is known as a diathermic current. (2) Electricity can produce chemical caustics within the tissues. The quantity formed is under the control of the operator. The destruction of abnormal tissue by this method is a form of treatment known as electro-chemical cauterization. The galvanic current is used for the purpose. The same current is used for treatment by a process which cannot be copied by other agents. Thus when solutions of therapeutic chemicals (drugs) are placed in contact with the skin or a mucous membrane the galvanic current can make them penetrate to a depth which cannot be reached by the simple process of diffusion. This constitutes a form of treatment known as *medical ionization.* (3) The use of electricity for stimulating muscle and nerve enables us to bring about one effect, at least, which cannot be achieved by any other artificial agent. Voluntary muscle can be made to contract; it can be made to give a twitch, or a series of twitches, or a prolonged contraction, both when voluntary power is preserved and when it is lost. Faradic and sinusoidal currents are generally used for procuring contraction when the reactions of the muscle are of the normal type. If, in addition, the use of electricity has an encouraging effect on the patient's mind, it should not therefore be deprecated, and the therapeutic nihilist will be furnished with a reason for attributing some value to it.

The best examples of the power of electricity (in the form of the diathermic current) to raise the temperature of parts which are inaccessible to heat derived "ready made" from external objects, are seen in the male and female pelvic organs. Not only is it possible to heat the female urethra, the cervix, the body of the uterus, the tubes, ovaries, prostate and seminal vesicles, the anal canal and rectum, and the pelvic cellular tissues, but the therapeutic results in certain diseases of these parts are striking and far-reaching. By means of an ingenious method devised by C. A. Robinson an infected and inflamed cervix uteri can be heated by diathermy to the maximum temperature that is considered advisable, namely, 115° F. A course of this treatment will free the cervix from infection by pathogenic organisms, such as gonococci and hæmolytic streptococci. The importance of achieving such a result is obvious in view of the possible consequences of untreated cervicitis. One of the most serious is infective arthritis, which is very commonly due to primary infection of the cervix uteri, far more frequently, indeed, than to primary infection of any other part even.

If arthritis has developed it is not too late to disinfect the cervix by diathermy, and the treatment is urgently necessary, as otherwise the arthritis will progress and further damage result. If, however, the infection is eradicated from the cervix, the arthritic inflammation will cease. The final condition of the joints will depend on the amount of structural damage inflicted before the treatment of the cervix was commenced. If the case is early and no damage has taken place, a real cure will be effected. The following symptoms may indicate that a woman with cervicitis may develop infective arthritis: deterioration of general health, undue fatigue on exertion, the occurrence of bruises on the body which cannot be accounted for, loss of healthy colour and a muddy complexion; these symptoms indicate toxæmia. C. A. Robinson has shown that chronic low backache is commonly due to cervicitis, disappears after removal of the cervicitis by diathermy, and that the occurrence of this symptom in women with cervicitis is the prelude to infective arthritis. The removal of the cervicitis by diathermy and the elimination of the source of the toxins are followed by striking improvement in the general health, the sense of fatigue disappears and her colour and activity return. The results are among the most satisfactory in the whole realm of therapeutics. By means of the diathermic current it is possible, as already stated, to heat the fallopian tubes and the ovaries. Chronic salpingitis, if non-tuberculous, can be brought to an end by diathermy, though surgical treatment is necessary in the suppurative forms. Heating the ovaries by diathermy appears to increase their endocrine activity, especially when that function is waning at the climacteric; this may explain the amelioration, by pelvic diathermy, of certain troubles liable to occur at this time of life, for it may be assumed that the heat enables the ovaries to maintain their endocrine function until the other ductless glands can compensate for the loss. Among the troubles referred to above is a form of non-infective arthritis which, in its early stages, can be arrested by subjecting the pelvic contents to diathermy. There is good evidence that the *direct* action of the treatment is on the ovaries.

In male subjects the prostate and seminal vesicles are even more inaccessible than the cervix uteri to treatment by simple methods. They can, however, be heated by the diathermic current. They are very liable to infection, particularly by the gonococcus, which may spread to the epididymis, and there is always the possibility that metastatic inflammation of the joints and fibrous tissues may follow. The results of diathermy on the infected prostate and seminal vesicles and on the joints and fibrous tissues are no less satisfactory than those obtained in women when infective arthritis is treated by subjecting the cervix to diathermy. Epididymitis can be made to disappear if the prostate and vesicles are treated by diathermy, even though the contents of the scrotum are not included in the path of the current. But if the last-mentioned parts are subjected to diathermy at the same time as the prostate and vesicles, pain will actually begin to diminish during the first treatment. After three treatments and the expiration of ten days pain, tenderness and swelling will have gone. In some cases there remains a slight thickening of the globus minor, but without pain or tenderness. These results, in comparison with those obtained by applying hot objects to the scrotum, furnish a striking example of the relative values of diathermy and " epithermy."

Brief reference may be made to a few more modern developments in the use of diathermy; in puerperal infection, in which it was first realized and undertaken by C. A. Robinson, a much higher percentage of cures has been obtained than by any other method; he has treated ninety cases, and will publish his results when the number reaches one hundred. The low mortality-rate is a veritable triumph for diathermy.

Diathermy is now employed to raise the temperature of the whole body to 105° F. and to procure the so-called " therapeutic fever "; in general paralysis of the insane it yields as high a proportion of successful results as the artificial production of malaria and, moreover, is safer. Mention might also be made of the use of a current (belonging to the same family as the diathermic current) in the treatment known originally as *fulguration*, or better as electro-desiccation. In this form of treatment abnormal tissue is killed by directing sparks on it. Those who have not heard of it may be inclined to laugh. It is true that other methods, such as burning and chemical cauterization, will destroy tissue. The sparks dry or desiccate the tissues, and the subsequent reaction is much less, and the cosmetic results far better than those of the actual cautery or chemicals; the scars are soft, smooth and never contract. In a patient with a vascular fibrous growth of a vocal cord treated by electro-desiccation voice was fully regained and the scar left was almost imperceptible.

Various examples can be given to show how the employment of electricity (in the form of the galvanic current) for introducing germicidal or cauterizing ions can achieve success in diseases in which the simple application of solutions or solids to the surface usually fails. The value of the electrical method (ionization) can be seen in the treatment of cervicitis; although a much greater experience has been obtained with diathermy in this disease, ionization is much more effective than the treatment commonly employed, viz., the packing of the cervical canal with germicidal preparations, and will succeed when the last-mentioned method fails. If a zinc rod is placed in the canal and connected to the positive pole of a galvanic battery there will be a migration of zinc ions into the mucous membrane. They will kill bacteria on their path. They will unite with the tissue proteins and form zinc albuminate which provides a sterile protective lining and remains in position for ten to fifteen days. During this time reinfection from without cannot take place. If, on the other hand, the zinc rod is connected to the negative pole of the battery there will be a migration into the cervix of hydroxyl ions which have germicidal properties and in addition act indirectly on the glands of the cervix and increase their secretion for a day or more after the ionization, thus securing most efficient drainage. When the discharge is inspissated it is advisable to begin the treatment with the zinc rod attached to the negative pole, and when free drainage is established the rod should be connected to the positive pole so that the protective lining of zinc albuminate may form.

From what has been said of the value of diathermy and ionization in cervicitis the reader may conclude that vaginal irrigation and packing the cervical canal with germicidal preparations is of little value in the treatment of this disease and the metastatic and constitutional troubles that arise from it. As a matter of fact, during the years when the writer and Dr. C. A.

Robinson were investigating the effects of diathermy on the pelvic organs, all their patients had been previously treated unsuccessfully by the methods named.

Zinc ionization is of value in the treatment of chronic inflammation, with or without ulceration, of the mucous membranes of other parts as well as the cervix. Special mention must be made of the middle ear, the nasal cavities, the colon and the rectum, for it is in chronic and persistent inflammation of these parts that the electrical method is usually successful when the customary treatment fails. Chronic suppurative otitis media can be brought to an end by one, or at the most two, applications of the treatment, if caries of bone is absent; papillomas and cholesteatomas, if present must first be removed. One of the special advantages of the electrical method is that the patient need not be admitted into a hospital or nursing home. The pioneer work on the treatment of this disease by zinc ionization was conducted by Friel. Chronic catarrhal rhinitis can frequently be brought to an end by zinc ionization after irrigation or spraying has failed. This is also true of hay fever. The value of zinc ionization in chronic ulcerative colitis, which was known to specialists in electrotherapy before the beginning of the present century, has recently been confirmed by Julius Burnford[1]. In chronic infective proctitis the introduction of zinc ions by the galvanic current is a very effective form of treatment. It appears to act as a specific, although this word cannot properly be used when the cause of the disease is unknown.

The following examples illustrate the value of the galvanic current as a cauterizing agent. A fine needle electrode can be placed in the follicle of an unwanted hair. The passage of the current leads to the formation of caustics around the needle. The caustics destroy the follicle, and the hair with its pigmented bulb can be lifted out. If the needle is insulated, except at its free end, the cauterization can be restricted, with precision, to the base of the follicle, the skin being undamaged. By inserting the tip of a zinc needle into the central vessel of a stellate vein or the base of a pedunculated wart and passing the current the whole of the stellate vein or the entire wart will disappear, leaving no mark. As already stated, the value of the galvanic current as a cauterizing agent is that it produces the caustics in the situation needed and in the amount desired. Another advantage is the slight reaction after the treatment and the excellence of the cosmetic results.

Among the morbid conditions in which electricity is useful on account of its power of stimulating the excitable tissues, the most obvious are those in which some muscular weakness and wasting persist after the responsible factors have ceased to act; thus, when inflammation in a joint, due to injury or disease, has subsided, the muscles controlling the movement of the joint can be helped to regain their power if they are artificially exercised by the faradic or sinusoidal current. This help is required when the patient cannot use the muscles or cannot use them adequately; thus, when extension of the knee is weak and limited, the vastus internus may be more wasted and weak than the rest of the quadriceps. This part of the muscle can be given a greater share of artificial exercise, and an increase in its size can be seen to take place. When muscles are weakened or paralysed in consequence of disease or injury of their motor nerves recovery can be accelerated if they are artificially exercised by electrical methods, provided of course the injury or disease has been adequately treated. Further, most patients are encouraged when they see their paralysed muscles contract.

Electrical contraction of muscle can usefully be practised when movement is painful in consequence of adhesions left between muscle and fibrous tissue in cases of past fibrositis; the contraction should take the form of a series of separate twitches, thirty or so, per minute; the twitches are painful at first, but the pain soon diminishes and disappears while the initial treatment is being administered. The range of painless movement can gradually be increased by this method. A preliminary application of heat, especially diathermy, hastens the results, if it is made before the twitches are produced. An induction coil provided with a slowly acting interrupter may be used, but the twitches can be more effectively obtained by means of the static machine when large masses of muscle, such as the gluteal and lumbar, are involved.

The diseases chosen, so far, are some of those which resist, or do not respond well, to forms of treatment other than electrical; and the reasons why electrical treatment produces its results are easy to understand. Other maladies which often respond to simpler forms of treatment can be treated electrically with fair prospect of success should the other methods fail. In these also the mode of action of the electricity is evident. There are yet other diseases which react better or more quickly to electricity; but in these the mode of action of the treatment is obscure or uncertain. When this is the case the usual custom is to *pro*scribe rather than *pre*scribe electrical treatment, and select some other form of therapy in which the *modus operandi* is known. For three-quarters of a century it has been acknowledged that the galvanic current is of particular value in relieving the pain and accelerating the resolution of inflammation, especially after *injury*. In a few quarters the current is used for this purpose, but more commonly all forms of electrical treatment in cases of injury are barred, and if any kind of physical treatment is prescribed, it is massage—the mode of action of mechanical treatment being more readily understood than that of electricity. In cases of recent trauma, without fracture or dislocation, it would seem inadvisable to procure contraction of the muscles controlling the joint; but "things are not what they seem." Treatment of this kind is actually beneficial. Its effects cannot entirely be attributed to the contraction of the muscles; and while uncertainty exists the treatment will not be practised as widely as its efficiency deserves. Those who are interested should consult the book by Morton Smart, who conducted much of the pioneer work on the subject[2].

The value of the sinusoidal current, administered in full-length baths, in poliomyelitis, after the acute stage has subsided, is known to few. It was introduced by the late Lewis Jones, who practised the treatment for many years at St. Bartholomew's Hospital. The current does not cause contraction of muscles showing the reaction of degeneration, and when administered by the bath method its strength is not raised to a value sufficiently high to make the normal muscles contract. This reason and the fact that the method of action of the current is not precisely understood are responsible for the present neglect of the sinusoidal current in the treatment of poliomyelitis.

The second purpose of this article is to consider how far, in the interests of his patient, the general practitioner should undertake electrical treatment, in whole or in part. Before this question is discussed it should be realized that there is a public demand for electrical, as well as other forms of physical treatment. This is met in various ways; the Chartered Society of Massage and Medical Gymnastics has a roll of more than 8,000 members, most of whom have also been trained to administer treatment by the galvanic, faradic, sinusoidal and diathermic currents, and by radiant heat and ultra-violet rays; they hold certificates of proficiency, duly tested by examination by medical specialists in these subjects. They only receive patients sent by a doctor and await his instructions as to the kind of treatment to be given. In addition to members of the Chartered Society there are a great many independent non-medical administrators of physical treatment who have picked up some knowledge of the subject and are not bound by a charge, such as the Chartered Society imposes on its members, to receive as patients only those sent by medical men. The County Councils are beginning to add departments of electrical and physical therapy to the municipal hospitals, one of which is probably the finest and best equipped in the kingdom. There are various institutes run by non-medical men and women who advertise for and receive patients. Pretending to make a diagnosis by hearing the patient's symptoms (a stethoscope, perhaps, being placed on the desk) they administer any form of treatment they think fit or the patient has a fancy for. These institutes have arisen in response to public demand, and it must be admitted that the other schemes for the supply of electrical treatment have arisen more in response to a public than to a professional demand; a committee of laymen originated the fine department specially mentioned above. As time goes on the demand for electrical and other forms of physical treatment, in place of the bottle of medicine, is certain to increase. Since it has long passed its era of empiricism and has a value of its own in a number of diseases, the request for electrical treatment, on the part of the patient, should be sympathetically considered by the practitioner. Even if the patient does not ask for it, the doctor should know whether or not it is advisable, what form to prescribe, and must decide who is to administer it. It must be realized first of all that special training and experience are necessary before electrotherapy, as it is to-day, can properly be practised. Gone are the days when a practitioner could spend an afternoon in the electrical department of a hospital, see the cases treated, and then practise electro-therapy. The subject has extended so widely in recent years that knowledge is required of physics, electro-technics, the nature and biological properties of different currents, and the various methods of using them in the treatment of diseases of the eye, ear, nose, uterus, urethra, prostate, rectum, and colon. There is no region of the body which is not treated by electrical methods for one disease or another. If a practitioner obtains the requisite knowledge and experience he becomes a specialist, and if he administers the treatment to such cases in his practice that will benefit from it (and can pay for it) he will have no time for general medical work. If he wishes, however, to continue in general practice it is in his power to do an immense amount of good, and it is not too much to say that the future of electrotherapy lies largely in his hands. It is to him that patients first come. If he knows the diseases and cases for which electrical treatment is indicated (either as the treatment of choice, or as one which holds out a reasonable prospect of success after simple methods have failed) and makes arrangements for it to be conducted by those who are properly trained to do it, the subject of electrotherapy will come much more under the *œgis* of the medical profession than it is at present. But if the patient is left to find out for himself that electrical treatment is of value in his complaint he is more likely to go to an "institute" or to some unqualified worker who treated one of his friends, than to a doctor. Actions of this kind will increase the belief which prevails, on the part of the public, that anybody who possesses the apparatus and knows how to connect the patient to it, can practise electrotherapy. It is probably true that no branch of treatment is so widely practised by the untrained worker and so little recognized by the medical profession as electrotherapy. More is known of treatment by the public now than a generation ago, and if the practitioner remains apathetic the subject of electrotherapy will pass out of the hands of the medical profession.

A practitioner who knows when electrical treatment is indicated, but has not the time, or is unable, to conduct it himself there is much that can be done under his direction by the members of the Chartered Society who have been trained how to administer electrical treatment. In his capacity as examiner for several years the writer can say that they know their work well and conduct it conscientiously, that some of them are wide readers of books on electrical and physical therapy, not only from interest, but also because they may not receive any instructions about the form of electrical treatment to be administered. As the members of the Chartered Society are charged not to treat patients who do not come from a doctor, the doctor should adopt a reciprocal attitude and refer his patients to them.

For the progress of electrotherapy there is need for medical specialists as well as trained non-medical administrators. The former are necessary to take charge of electrical departments in hospitals and give instruction to the administrators of the treatment. They are necessary, also, for conducting more elaborate forms of treatment which cannot be administered by members of the Chartered Society. These include the surgical forms of electrical treatment as well as those which require special skill and experience (such as the application of diathermy to the cervix uteri) and those which require knowledge of medicine and changing pathological conditions for their efficient practice (such, for example, as the use of diathermy for the treatment of hyperpiesia). But it is on the action and attitude of the general practitioner that the practice and progress of medical electricity on right lines will most largely depend.

References

[1] Burnford, J.; *Brit. Med. Journ.*, 1930, ii, 640.

[2] Smart, M.: "The Principles of Treatment of Muscles and Joints by graduated muscular contractions." Oxford University Press, 1933.

REVIEWS OF BOOKS

Rose and Carless' Manual of Surgery for Students and Practitioners. By CECIL P. G. WAKELEY, D.SC., F.R.C.S., F.R.S.E. and JOHN B. HUNTER, *M.C.*, M.CH., F.R.C.S. Fourteenth Edition. London: Baillière, Tindall and Cox, 1933. Pp. x and 1547. Illustrations 721; 24 plates, 16 in colour. Price 30s.

WE welcome with pleasure the latest version of the famous work which is still the most widely read of the English textbooks of surgery. In our student days there was none other that supplied our need of a book so comprehensive as to be reliable as a work of reference, yet within the compass of a single volume which could justly be called a manual. This character is well maintained, but compared with the seventh edition of twenty-five years ago, there is an increase of only a hundred pages, so that the authors have probably exercised as great a care in their excisions as in the additions necessitated by surgical progress. It appears to be as nearly true to-day as formerly that in surgery there is neither fruit of old experience nor of modern advance to which reference cannot be found in Rose and Carless. Nevertheless we wish that the discerning authors had striven more for critical selection than the encyclopædic inclusion of all progress whether it has stood trial or no. The main improvements are found in new chapters on general pathological subjects, by Dr. Carnegie Dickson, on the surgery of the ear, nose and throat, by Mr. Negus, and also in the urinary chapters and in that devoted to fractures. Here the methods both of Delbet and of Böhler receive notice, though the ambulatory plaster of the former is described in a modified form with a notch cut out of the heel piece, an heretical alteration that, according to Professor Delbet, impairs control of backward displacement. It is still stated that the deformity of Colles' fracture has little tendency to recurrence after disimpaction, a negation of the reasons underlying the multiplicity of methods in vogue at the present time in the treatment of this injury. The style is easy and fluent though perhaps one might have expected compression to make it unreadable, but it does not betray that care for language that we have noticed in some of the Scottish textbooks. There is also evidence of inadequate revision of the text. A safe dose of avertin is obscurely said to be "up to 0·1 gramme of the patient's body weight." On p. 687 the reader is warned against precocious mobilization of joints the seat of suppurative arthritis in case "too rash or rapid a movement" may cause a flare up of bacterial activity, while overleaf he is nevertheless recommended to urge or coerce the patient into moving his suppurating joint actively however painful it may be, in order that pus may be squeezed out of the synovial cavity! No reconciliation of these antagonistic modes is attempted and the student is left in clueless perplexity. There are other incongruities, but for the greater part of the matter we have great praise, reaping as it does the advantages to be gained from the learning and sound sense of its two eminent authors. There is an excellent and concise chapter on the thyroid gland, in which the value of medical and surgical co-operation is clearly indicated. The recommendations for the management of acute appendicitis are unusual, as an expectant attitude is counselled if possible during the first 48 hours, and at the end of that time operation is recommended only "if the symptoms are not commencing to abate." This scheme of treatment is in fact the reversal of to-day's vogue for operating always during the first 48 hours, but, should this period have already elapsed, operating only if the patient's condition urgently compels interference with the natural course of the disease. For ourselves we hold unsound the acceptance of the lapse of any specific number of hours as dictating change of attitude, but if 48 hours is to be held to be a crucial period in this disease, we think that the present authors' custom is as good as the more fashionable one. The printing on clay paper is of the clearest. The illustrations are profuse, well chosen, and of excellent reproduction, and we congratulate Mr. Wakeley on his preference for drawings at the expense of photographs. Dr. Graham Hodgson's radiographs are as near perfection as any we have seen, and we tender our compliments to authors and publishers on the production of a worthy sequel to the predecessors of this edition, at a price of no more than thirty shillings.

Recent Progress in Medicine and Surgery, 1919–1933. Edited by SIR JOHN COLLIE, C.M.G., M.D. London: H. K. Lewis & Co., 1933. Pp. xii and 368. Illustrations 38, charts 3. Price 16s.

SIR JOHN COLLIE must be congratulated on his brilliant idea of bringing together in one volume twenty-one articles by authors of high repute, each dealing briefly with the progress in his own branch of medicine in the years since the war. There are, however, some rather surprising blanks in the volume: for example, there is no article dealing with the revolutionary advances in cardiology, pneumonia is mentioned only under the heading of bacteriology, artificial pneumothorax is nowhere mentioned at all, peptic ulcer is the only affection of the gastro-intestinal tract that receives attention, and the advances in surgery dealt with are limited to those in orthopædic surgery, urology, surgical tuberculosis, manipulative surgery, and plastic surgery. Some of the articles rather overlap, such as those on urology and vitamins respectively, and the radiology of the renal tract, for instance, is much more adequately dealt with under the heading of urology than under radiology. The volume, therefore, rather suffers from the defects of having a multiplicity of authors, but the individual articles are excellent and the practitioner will find them all good reading. Among the most noteworthy contributions are Sir John Collie's own striking article on diphtheria immunization, Emeritus Professor Lovell Gulland's summary of modern knowledge of pernicious anæmia, and Professor Langdon Brown's sage review of endocrinology.

The Thyroid Gland: its Chemistry and Physiology. By C. R. Harington, M.A., Ph.D., F.R.S. London: Oxford University Press, Humphrey Milford, 1933. Pp. xiii and 222. Illustrations 28. Price 15s.

This is an extremely authoritative and readable account of a complicated subject by one who has done valuable work on the chemistry of the thyroid gland, and it is pleasant to see its dedication to Professor George Barger of Edinburgh, his colleague in this line of research. The general physiology and chemistry of the thyroid gland are first sketched, but special attention is focused on the iodine compounds, thyroxine, the special physiology of the thyroid, and its inter-relations with other endocrine glands. Whenever it seems desirable pathological points are brought in to bear on the chemical and physiological problems, particularly in connection with goitre, cretinism, and exophthalmic goitre which Professor Harington prefers to call Graves' disease as a less committal title. The history of the thyroid and these morbid conditions is given with quotations from the original sources, some of which are otherwise difficult of access. Clinicians will read with keen interest the discussion of the etiology of Graves' disease; in 1886 P. J. Moebius argued that it was due to a toxic secretion of the abnormal thyroid, and in recent years H. S. Plummer, of the Mayo Clinic, has adopted this view of dysthyroidism with some modifications and revived the iodine treatment which had been discontinued for years largely as the result of Theodor Kocher's opposition. Professor Harington marshals the arguments against dysthyroidism and concludes that the symptoms of Graves' disease are due to a "thyroid diarrhœa," to use Kocher's phrase, or hyperthyroidism; but fully admits the practical value of iodine as a pre-operative measure, though its explanation is not clear. He then raises the probability that the thyroid disorder is secondary to some extrinsic factor, such as loss of the inhibitory influence of the adrenal cortex or excessive stimulation of the thyroid by the anterior lobe of the pituitary. Though neither of these two hypotheses can yet be accepted, it is on some such lines that an explanation is anticipated by the author who points out the urgent need for a solution, for in the present position the only practical means of relief is a palliative operation devoid of any rational basis, a reproach to all interested in the physiology of the thyroid.

Blood Diseases in Clinical Practice. By Professor P. Morawitz. Translated from the second German edition by A. Piney, M.D., M.R.C.P. The Gloucester Series. London: J. & A. Churchill. Pp. vii and 102. Price 7s. 6d.

This is a remarkable example of the *multum in parvo,* for in ten chapters or one hundred pages of text, admirably translated by Dr. Piney, an enormous amount of information, based on long experience, is clearly given by Professor P. Morawitz of Leipzig. It is essentially practical and mainly deals with diagnosis and treatment rather than with matters of theoretical interest. In the opening chapter on examination of the blood in general practice it is emphatically stated that the methods of blood examination really essential are not more difficult or time-consuming than many other routine procedures, such as exploratory needling, estimation of blood pressure, and ordinary urine examination. Pernicious anæmia is described in two chapters, followed by an account of chronic hæmolytic jaundice, in which, following Nægele, the author heads the section with the title "constitutional hæmolytic anæmia." After chapters on chlorosis and secondary anæmias, leukæmia, Hodgkin's disease, the hæmorrhagie diathesis, polycythæmia and other forms of splenomegaly there is in conclusion a useful account of the blood changes in a number of other diseases.

Sex Efficiency through Exercises: Special Physical Culture for Women. By TH. H. VAN DE VELDE, M.D., formerly Director of the Gynæcological Clinic at Haarlem. London: William Heinemann (Medical Books), Ltd., 1933. Pp. vii and 163. With 480 cinematographic and 54 full-page illustrations. Price 25s.

THE title of Dr. Van De Velde's latest book may be somewhat misleading unless the reader realizes that the term "sex efficiency" is used in its most comprehensive sense and embraces not only appropriate participation in coitus, but also normal gestation and parturition. Dr. Van De Velde has elaborated a scheme of exercises for the development of the pelvic musculature, for he is emphatic that in the act of sexual congress correct action and co-ordination of the pelvic muscles are of paramount importance in securing mutual satisfaction; while in childbirth voluntary control over the muscles of the pelvic floor, which may be acquired by suitable exercises during pregnancy, is of great assistance in minimizing the fatigue of labour and may shorten its duration. In the puerperium the performance of appropriate exercises is designed to restore tone to the stretched abdominal and perineal muscles and so to prevent such gynæcological complications of child-bearing as uterine prolapse and visceroptosis. For this section especially the book may be recommended to those who are interested in maternity work. All the exercises are explained in a simple manner and many are illustrated by photographs. In addition there is a cinematographic supplement, in which exercises for the development of control over the pelvic muscles are demonstrated. Dr. Van De Velde's book may do much to teach women how to restore their physical fitness after child-bearing.

RECENT ADVANCES IN THERAPEUTICS, abstracted from the medical journals of the world, and PRACTICAL NOTES, contributed by readers from their own experience in practice, will be resumed in the November number of THE PRACTITIONER.

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STONE IN THE URETER

By SIR W. I. de C. WHEELER, M.D., Hon. M.Ch., F.R.C.S.I.

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IN recent years, with the development of the operating cystoscope and of radiological technique, there has been a marked advance in the surgery of renal and ureteral stones. While many observations are only of academic interest, well-timed emphasis has been laid on the failure of early diagnosis, and the disasters which follow upon delay in adequate treatment. The cause of the formation of calculi in the urinary tract is still obscure. They cannot be produced experimentally by alteration of the normal diet, and it is doubtful if pre-existing stricture of the ureter is a predisposing cause. Micro-organisms are probably a factor, for in the great majority of cases there is a gross infection of the tonsils and teeth. Stones in the kidney have developed in animals with remarkable regularity after the experimental production of septic foci in the dental roots. Apart from general surgical principles, there is thus a special indication for pre-operative attention to oral sepsis in the case of patients suffering from urinary calculi. Vitamin deficiency may be at fault. Bumpus and Thompson[1] sum up the situation when they state: "The formation of urinary calculi has been attributed to whatever phase of scientific endeavour was at the time popular."

Ureteric calculi, with few exceptions, are renal calculi which have been carried downwards by the urinary stream assisted by increased effort on the part of the ureteric musculature. In favourable circumstances they may be passed without ill-effects. On the other hand, they may become stationary at points where the ureter changes the direction of its curve, or where the calibre is normally diminished. The majority are found lodged in the pelvic portion. In the early stages pain and other familiar signs and symptoms appear when the calculus is in motion; they disappear as a rule when it comes to rest. Later on, increasing obstruction and superimposed infection modify the picture and give rise to more constant clinical disturbance. Stones in the ureter occur with equal frequency on either side, they are found about twice as often in males as in females, and are most common between the ages of thirty and fifty. Uric acid stones seldom lodge in the ureter, they are smooth and round, and pass onwards without difficulty. Oxalate stones and those composed of phosphates in infected cases are far more commonly arrested in their passage downwards. The size is very variable, some of those on record have measured as much as seven to eight inches in length by an inch in diameter. Those which give rise to the most acute symptoms, including calculous anuria, are often minute; conversely, those of large dimensions may remain silent. The largest I have seen was two inches long and two and a-half inches in circumference (Fig. 1).

In this case there never were any symptoms to direct attention to the urinary tract. The patient was a woman about fifty years of age, who came to hospital with a large abscess in Petit's triangle on the right side. The abscess contained a quantity of sterile pus, and, pending further investigation, a provisional diagnosis of tuberculous periostitis was made. X-ray photographs revealed the ureteral calculus; cystoscopy and renal function tests indicated destruction of the kidney above.

Notwithstanding the repeated efforts of genito-urinary evangelists to draw attention to the pitfalls in connection with the diagnosis of ureteral calculi, they are not yet sufficiently appreciated by the profession as a whole. The pain associated with stone in the ureter often does not declare itself in the manner which many textbooks describe. No doubt typical renal colic will be recognized in most instances and, when this includes strangury and hæmaturia, a mistake as to the further examinations indicated can scarcely be made. Cases of milder pain which take the course of the ureter towards the tip of the frenum are suggestive of stone, and again cystoscopy and X-ray photographs will, as a matter of course, be recommended. It is not so well known that painful nocturnal emissions and blood-stained semen may be produced by a stone in close relationship with the seminal vesicle. Pain may be referred to the opposite side. It seldom

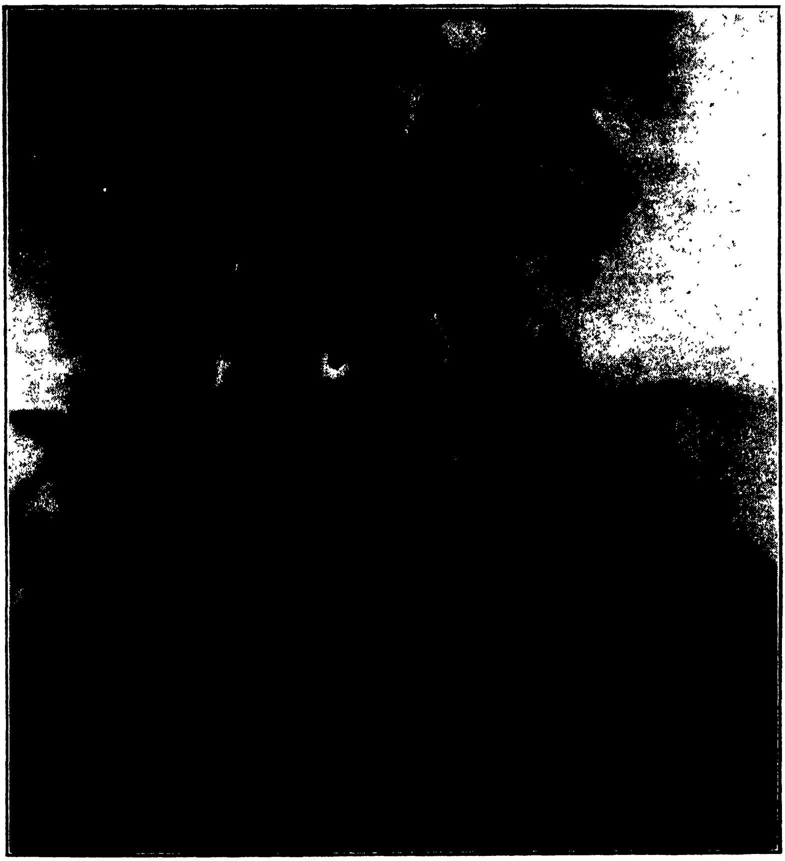

FIG. 1.—Large ureteric calculus in the right pelvic portion. Uroselectan shadow shown on left side immediately after injection.

radiates to the inner side of the thigh or to the genitals. It was located in the right lower quadrant of the abdomen without radiation in 138 cases mentioned by Bumpus and Thompson. These writers[1] point out that in 162 cases the pain was entirely epigastric, and a diagnosis of cholecystitis had been made. This same epigastric pain is so deceptive that it may point *inter alia* to trouble in the appendix, a retroverted uterus, or gastric and duodenal ulceration. In the same article, 254 cases of ureteral calculi are mentioned in which there was no urinary disturbance. One case in five had been operated upon for appendicitis. 25 per cent. of cases of ureteral stone reported by C. P. Mathé[2] had undergone the same operation. These records show how easily the diagnosis of urinary calculus may be missed.

The preliminary examination of every chronic abdominal case should include a straight X-ray photograph of the urinary tract, and a routine search in the urine for pus and blood cells. It must be remembered, however, that in about 2 per cent. of the cases of stone no shadow is seen, and in about 12 per cent. pus and blood cells are absent. Furthermore, blood cells will be found in a number of cases after abdominal palpation in the renal area; they are also constantly present in cases of acute appendicitis when the appendix lies closely related to the ureter. The radiologist should be asked not only to make the usual investigations after a barium meal, but to give a report on the films taken before the meal is administered. It must not be forgotton that gastric or duodenal ulcer, or disease in the gall bladder or elsewhere, may be co-existent with the presence of urinary stones.

I reported a case recently[3] in which the breast had been removed for cancer. Some years later the patient lost weight and complained of increasing high abdominal discomfort, accompanied by vomiting. Abdominal metastases were suspected, but X-rays revealed the presence of stones in both kidneys. In addition an active ulcer (not malignant) of the lesser curvature of the stomach was shown. Gastrectomy under gas-oxygen and local anæsthesia cured the patient of her symptoms. The stones were too large and the renal function too much diminished to justify their removal. There were never any signs or symptoms to draw particular attention to the urinary tract (Fig. 2).

The possibility of multiple lesions in abdominal cases is too often overlooked. Shadows which appear in a film near or actually in the line of the ureter require careful interpretation. The skilled radiologist and experienced surgeon will recognize or suspect the shadows due to phleboliths, calcareous glands, opacities at the end of the Fallopian tubes and those in connection with the ovary. Concretions in the appendix and points of ossification in muscles and ligaments also throw shadows similar to stone in the ureter. The differentiation is made by photographs after the passage

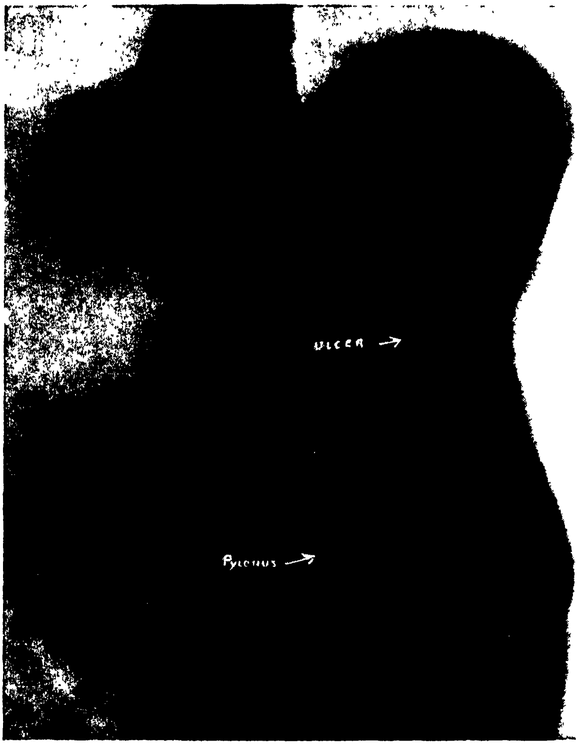

FIG. 2.—Multiple lesions. Cancer of the breast, non-malignant ulcer of the stomach, and bilateral branched renal calculi. The calculus on the right side is seen with barium in a coil of intestine mediately. The right kidney is obscured by the stomach. (After *Surg., Gyn. and Obstet.*, 1933, lvi, 19).

of an opaque catheter, or by demonstrating the shadow surrounded by the opaque medium in an ureterogram. Stereoscopic photographs are helpful in difficult cases.

Many patients with stone in the ureter come for examination bearing the imprint of mistaken diagnosis. A scar in the right iliac region indicating appendicectomy is all too frequent. Apart from the discredit attending such procedures, the removal of the appendix sometimes complicates the treatment of the ureteral calculus to an extent which changes a simple operation into a major and dangerous procedure.

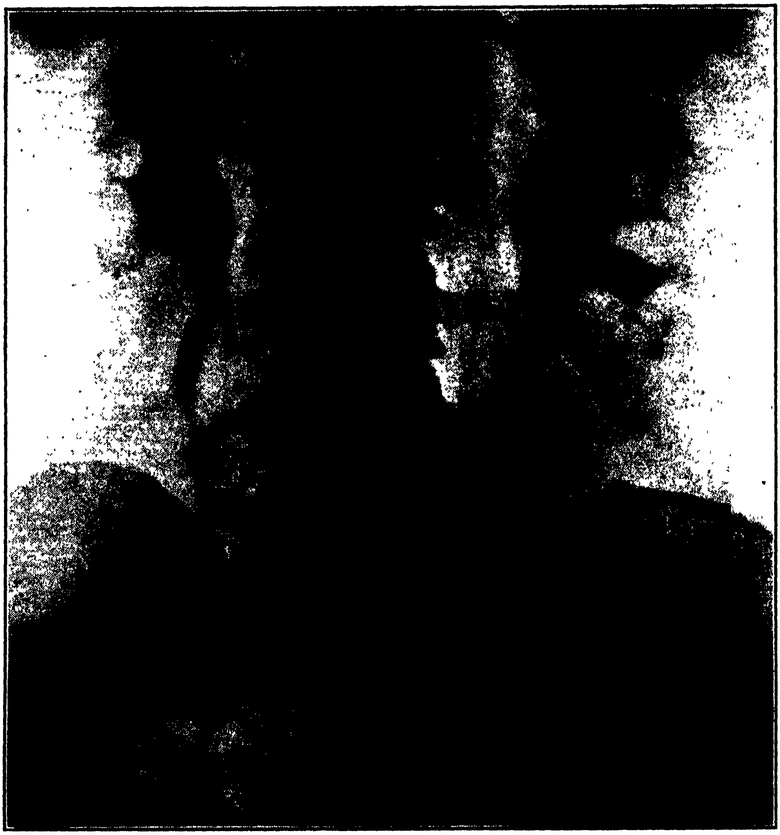

FIG. 3.—Square shadow of stone in left kidney and stone in right pelvic ureter 35 minutes after injection of uroselectan B. The ureteric shadow stops at the level of the stone on the right side.

I have at present under my care a middle-aged woman with a stone in the pelvic portion of her right ureter, and a stone in the left kidney. She is fat, and in general a poor surgical risk. A long paramedian scar marks the site of previous appendicectomy. Delayed diagnosis has resulted in gradual renal insufficiency. The passage of ureteral catheters, dilators and probangs failed to dislodge the stone from the ureter. Operative removal was attempted, but all lines of cleavage had disappeared, and it was found impossible to expose the ureter in this fat-laden abdomen without repeated tearing of the peritoneum. The operation was abandoned, as it was felt after the prolonged effort that removal of the stone might be followed by severe infection (Fig. 3).

Let us now consider the interference with renal function which follows failure of recognition and early removal of a stone in the ureter. Pathological changes in the kidney depend on the amount of obstruction, with or without infection caused by the calculus below. The obstruction is at first compensated for by hypertrophy of the involuntary muscle in the ureteric wall. Later atrophy and dilatation, and the gradual development of moderate hydronephrosis from back pressure follow. If there is infection the destructive processes are accelerated, and a pyonephrosis and complete destruction sooner or later supervene. The kidney on the opposite side undergoes compensatory hypertrophy as can be shown by the onset of pain, the rapid elimination of indigo carmine and other tests. In the presence of infection the nature of the organism should be ascertained. When the infection is due to organisms of the *Bacillus coli* group, it may disappear after the removal of the ureteral calculus; when staphylococci are present such a result may not be obtained. If the other kidney becomes infected all treatment is defied. It has been pointed out that the amount of kidney destruction has no relationship to the size of the stone. Many stones, enlarging as they lie in the ureter, make a nest in the lateral wall and the urine trickles freely past. Back pressure and infection arise eventually, but may be indefinitely delayed.

Before considering the comparatively simple proposition of removing the stone, the surgeon must make up his mind whether in a given case nephrectomy is not also indicated. When making a decision as regards the major operation apparent destruction of renal function must not be confused with real destruction. A stone in the ureter of recent origin may suppress the activity of the kidney to such an extent that by every known test it may appear incapable of function. Removal of such an obstruction by uretero-lithotomy is often followed by complete or almost complete return of renal activity. Renal recovery is sometimes the most surprising phenomenon in the surgery of the urinary tract. Renal cells, like hepatic and myocardial cells, have a definite power of regeneration if the causes producing degeneration are removed. Limited regeneration of the tubular epithelium has been found after operative incision, after moderate toxic destruction, and after the relief of a hydronephrosis. In proof of the power of repair it has been shown by animal experiment that a hydronephrosis of seven days' duration returns anatomically and functionally to normal, or almost normal, when the obstruction is relieved. The recovery is more prompt if the other kidney has been removed. If, on the other hand, compensatory hypertrophy of the other kidney has taken place, the atrophy of disuse and not repair may follow on the obstructed side. A small amount of renal tissue will suffice to maintain health, and thus the surgery of the kidney should be conservative, unless fears are felt for the safety of the organ on the other side from spreading infection. In old-standing cases some of the kidney is irreparably damaged, some is damaged but capable of regeneration, and in most cases there is a residue which has not yet become embarrassed. Occasionally when the kidney is explored with a view to nephrectomy, it may be found more advisable to perform nephrostomy, and slowly drain the kidney in the hope of improving function, before removal of the calculus.

It is interesting to note that the relief of back pressure followed by restoration of structure and function is by no means confined to the urinary tract. We see it in stone of the common bile duct, in ascites, empyema thoracis, intra-cranial tumours, and in such diverse conditions as glaucoma and hydramnios. I have on a previous occasion[4] suggested for general guidance that, " When an organ or system is suffering directly from pressure effects or indirectly from back pressure the greater the pressure the more gradual should be its relief." The release of back pressure by the removal of a stone from the ureter appears to be gradual, and does not produce the renal " shock " which is seen in cases after prostatectomy performed without sufficient preliminary decompression.

What are the indications for nephrectomy in cases of stone in the ureter ? If there is a large hydronephrosis and the opposite kidney has undergone compensatory hypertrophy, conservative surgery may be useless. The possibility of the spread of subsequent infection to the healthy organ is a serious consideration. If both kidneys are hydronephrotic there is no question of compensatory hypertrophy and nephrectomy is contra-indicated. If unilateral infection is advanced, and persists after the removal of the stone, the problem is much the same as that presented in cases of renal tuberculosis. Nephrectomy is the line of greatest safety. In some cases it is well to wait a year before deciding for or against nephrectomy in an infected case. By that time recurrence of stone formation in addition to persistence of the infection indicates a radical treatment. Great judgement and experience, combined with constant supervision, are necessary in coming to a decision. But for delayed diagnosis the problem would seldom arise.

Medical treatment.—Some patients pass very small stones at frequent intervals. The administration of large quantities of fluids and diuretics assists these cases. It is doubtful if belladonna in therapeutic doses or other drugs assist the expulsion of the stone by the release of spasm. The old prescription of a bottle of Contrexéville or Vichy water per diem, in addition to increased quantities of plain water and barley water, will accomplish all that can be expected from diuresis. In cases in which the stone remains stationary for many weeks and interferes with renal function, such treatment is ineffectual, for the excess fluids will be eliminated in a large measure by the kidney on the healthy side. If medical treatment is successful, repeated X-ray photographs will record descent of the stone. The treatment may be continued if the stone changes its position, as seen by photographs taken every two or three weeks, and if no untoward symptoms arise in the meantime.

Removal of the stone.—Manipulative methods with instruments passed into the ureter have gained in favour, but the open operative removal is attended with no additional risk. Judd has removed 400 stones from the ureter with one death. Operative removal is a certain and rapid procedure, cystoscopic methods are often tardy and uncertain. Manipulative procedures should be tried when small stones lie in the pelvic portion of the ureter. Bumpus states:[5] "Stones greater than 1·5 to 2 cm. in diameter should, as a rule, be removed by major surgical procedures." He also points out that if the position of the stone is so changed as to produce obstruction, secondary infection will follow and the patient will become rapidly dangerously ill. He urges that the patient should be warned that in the event of manipulative failure, grave symptoms may necessitate the major surgical procedure. "Watchful waiting has no place when signs of secondary infection have occurred, after failure to remove a stone in the ureter by manipulation."

If the stone is small and is known to have moved into the lower pelvic portion of the ureter recently, it can be dislodged by manipulative methods in approximately 80 per cent. of the cases. It is not possible in this article to describe all the various instruments designed for use with the cystoscope to dislodge ureteral calculi. Probangs, ureteric forceps, spiral wires, and many other devices have been recommended. For these ingenious instruments we are indebted to such distinguished pioneers as Canny Ryall, Buerger, Joly[6] and others. The simplest method of encouraging the onward passage of a stone is to pass a ureteric catheter by the stone and leave it in position for from two to five days. As large a catheter as possible, or multiple catheters, should be employed. If the ureteric orifice is minute it must be gradually dilated or divided by cystoscopic scissors or by fulguration in order that the stone may pass through.

The mechanism which dislodges a stone, following removal of an indwelling ureteric catheter, is not quite clear, but more than half the type of stones mentioned above will be passed after this simple procedure. When this method fails, spinal or sacral anæsthesia is usually employed, and the ureteric orifice is dilated with dilating bulbs or bougies. After dilatation, 1 c.cm. of liquid paraffin or olive oil is injected in the neighbourhood of the calculus. Extraction is then attempted by one of the instruments to which reference has been made. It can be taken from the bladder by forceps passed through an operating cystoscope or allowed to pass. After removal of the stone by manipulative methods, a ureteric catheter should be inserted to the renal pelvis, and left in position for forty-eight hours. This ensures a free passage for the urine during a period when congestion might cause temporary obstruction and acute pyelonephritis. How often manipulative attempts should be repeated must rest with the judgement of the individual surgeon. "Judgement," says C. H. Mayo,[7] "is a great asset, it makes the surgeon and the diagnostician both supermen. Such men with years of experience are able to diagnosticate and prognosticate with less laboratory aid than would be safe for those with less experience."

Operative removal.—Stones in the upper two-thirds of the ureter should be removed by open operation if they remain stationary for more than a month or six weeks. Large stones in the pelvic portion of the ureter should always be removed by operation, and those of smaller size which defy manipulative efforts should be treated in a similar manner. Various incisions are employed to expose the ureter. If the stone lies just below the renal pelvis, the lower pole of the kidney is first exposed by one of the lumbar incisions usually employed for nephrectomy. When the stone is lodged low down in the intramural portion, open operation is seldom necessary, but good exposure can be obtained by opening the bladder.

When the stone lies in any position below the upper third, and above the intramural segment, I prefer to expose the ureter near the middle of its course. This can be accomplished through an enlarged gridiron incision, or by division of the two oblique muscles, together with the transversalis muscle in the line of their fibres through a similar incision. The peritoneum is stripped inwards to expose the psoas muscle. The ureter is found clinging to the upraised peritoneum and is seen to "wriggle" when touched with the nose of a forceps. It is traced upwards or downwards until the stone is located. When the stone is low down in the pelvic portion it can be readily reached in this manner with the patient in the Trendelenberg position. In my experience, the ureter can be widely exposed and opened intraperitoneally if necessary, by mobilization and inward displacement of the colon without difficulty or undue risk. The surgeon should have a good headlight, or illuminated instruments, such as the Cameron lights. No overhead light is sufficient to illuminate the depths of a cavity. A suction apparatus will be found of great assistance in keeping a clear field.

Stones are removed from the ureter in the same manner as they are removed from the common or cystic duct, i.e. by cutting directly down upon them. When their position is clearly visualized they are gently coaxed from their bed and extracted. The opening in the ureter is closed by a couple of very fine catgut sutures. Occasionally, when the position of the stone renders access difficult, the ureter is opened at a higher level, and extraction is accomplished with a fine forceps from above. A drain of rubber tissue is passed down to the line of suture for forty-eight hours. Leakage as a rule does not occur. Such operations can be performed with a mortality of less than 2 per cent.

As in all surgical problems judgement as to the time for and the extent of the operation combined with minute attention to pre-operation and post operative care is more important than the actual operative procedure. For example, large quantities of glucose intravenously may be life-saving. The administration of a spinal anæsthetic, by the fall of blood pressure and consequent anuria, may be the cause of death.

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THE TOXIC IDIOPATHIES

THE ASTHMA-URTICARIA-HAY-FEVER GROUP (FREQUENTLY, BUT LOOSELY, CALLED ALLERGIC) WITH SPECIAL REFERENCE TO TREATMENT

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LET us take these names first: it is inconvenient to keep on using as a title for this group three or four of its members out of a total of perhaps a dozen and to string them together with hyphens as above; it is awkward to take one member only, usually asthma, decorate it with inverted commas to show it does not mean asthma only, and speak of urticaria as " asthma " of the skin, or hay fever as " asthma " of the nose. There must be a name to signify this group and nothing but this group; the term toxic idiopathy was coined for the purpose twelve years ago, and at least does not mean something else. I propose to use it as I have done before, and to say that hay fever is a toxic idiopathy, and that the group of diseases now under discussion are the toxic idiopathies. The term " Allergy,"* which has caught the fancy of many writers does not properly mean a disease at all but a reaction, and a reaction moreover which is not confined to this group. I propose in this article to use the term allergic reaction in the sense in which it was used by von Pirquet, who coined the phrase, i.e. as signifying an abnormal reaction such as one also finds in tuberculosis (which is certainly not a toxic idiopathy).

Perhaps we should next reconsider—even to-day—

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* If anyone doubts the mental confusion caused by the random use of the word allergy and its derivatives he has only to look it up in the various medical dictionaries, or attend an International Congress on " Allergy " (such as was held in London this summer), or listen to medical men speculating whether rheumatism or cancer " isn't really allergy." The word has been inflated till it has burst.

what right we have to think of our group as a group. Why may we consider such diverse states as asthma, paroxysmal rhinorrhœa (e.g. hay fever), urticaria (e.g. angio-neurotic œdema), eczema, migraine, epilepsy, functional albuminuria, paroxysmal hydrarthrosis—the toxic idiopathies, in fact—why may we consider all these as associated symptoms? For the sake of brevity, let three reasons suffice :—

(1) The toxic idiopathies are all hereditary, and although one particular manifestation may " run " in a family (Fig. 1) they may, any of them, be inherited together indiscriminately mixed (Fig. 2).

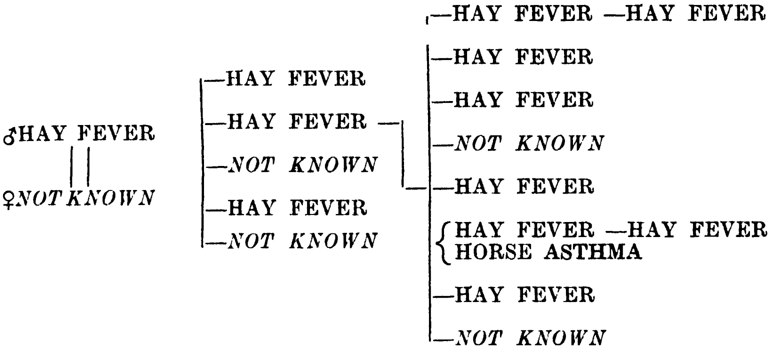

FIG. 1.

(2) If they are produced artificially, as may be done, for example, by injecting grass pollen extract into the veins of a hay fever subject, the experiment produces not rhinorrhœa or conjunctivitis (the normal symptoms of hay fever), but variants such as urticaria, asthma, migraine, and albuminuria, and occasionally paroxysmal hydrarthrosis or epilepsy.

(3) The toxic idiopathies vary not only in one family, but in one person in that family. They notoriously vary over the course of years, and also vary from day to day or from week to week. Thus an " asthmatic " out-patient will have chiefly (*a*) migraine one week, (*b*) the " lumps " (i.e. angio-neurotic œdema) the next, to be followed by (*c*) asthma beginning again on the end of the second week. Sometimes different toxic

idiopathies may be associated; migraine may always come on with asthma or with urticaria; a slight tendency to eczema may always become more pronounced when the subject has hay fever; and so forth. This and other evidence show that the toxic idiopathies are associated symptoms and share the same underlying pathological (symptom producing) mechanism.

For any rational as opposed to empirical treatment of a disease it would seem necessary to understand as much of this pathological mechanism as possible, and then try to put a spoke into one or several of its wheels. Even merely symptomatic treatment, if effective, must affect some part of this mechanism, though not a fundamental part. The point of therapeutic attack depends on utility and practicability; the line or lines of treatment chosen, though presumably the best in the circumstances and maybe adequate to obviate the symptoms, are probably only one of the ways towards the desired end—the cure of the patient.

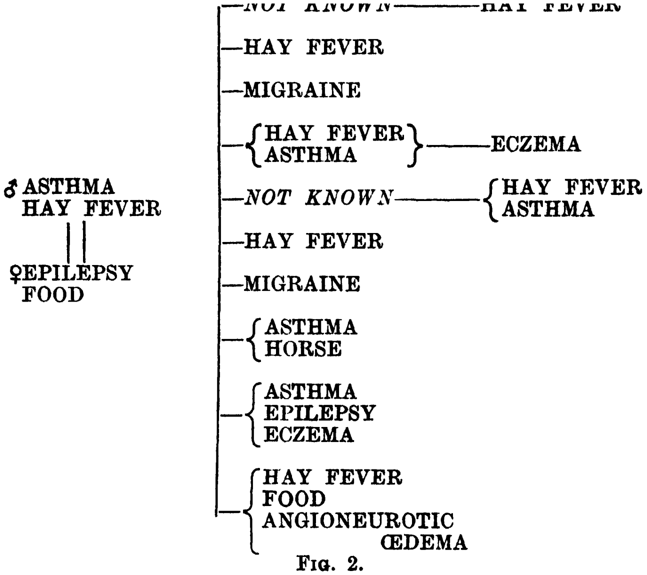

Fig. 2.

I propose to discuss each part or possible part of the mechanism of the toxic idiopathies separately, together with what seems to be the appropriate treatment for each part. I suggest that, when considering what old method to use, or on hearing the claims of some new method warmly advocated, it is useful to try to relate them to what we understand of the underlying pathological mechanism. Our obligation is twofold: if we are convinced that a method is effective we should not rest till we know how it works—i.e. what part of the machinery of the disease it is switching off or slowing down; if we detect the presence of a pathological agent we should ask ourselves how best it can be put out of action by treatment. In this article each part of the causal mechanism as it is introduced will be indicated by block capitals. It is not to be supposed that the list is complete, e.g. the nebulous heading "metabolism" must hide many important causal factors concerning which at present we know little or nothing. Again, "Bacterial Infection" does not fit very logically into our scheme; it has been separated because important separate treatment seems necessary.

(I) HEREDITY, as we have already seen (Figs. 1 and 2), is a factor in the pathological mechanism, and we may suspect that eugenists, when talking freely among themselves, would like to describe this as the "*causa causans*" of all our troubles. What is inherited is not a toxic idiopathy, but some tendency to develop one or several: if and when these idiopathies occur they are not usually congenital or permanent; they wax and wane and may change from one to another. *Diagnosis* is influenced by this factor of heredity; an aunt with hay fever and a cousin with eczema will render a diagnosis of asthma in a patient the more probable. So far as *treatment* is concerned, only the eugenist can effect anything, and his prognostications would be most dubious. "Have I any right to have children?" is often asked; but usually, I think, to obtain medical justification for a course of childlessness already settled.

(II) Some METABOLIC ABNORMALITY is presumably inherited and without itself producing recognizable symptoms, opens the door to the toxic idiopathies. Guesses (without sufficient, often without any, experimental backing up to date) are made in the various directions, such as adrenal deficiency, hypochlorhydria, imbalance, psychological instability, and, of course, immunological abnormalities. One may hear rival factions declare "it is all acidosis," "it is all alkalosis," or again, "the trouble comes from the change from one of these states to the other." Then again the internal secretions particularly suggest themselves because of the successful part played by adrenaline in symptomatic treatment. There is no evidence, however, that any of the endocrines are consistently abnormal in the toxic idiopathies; none of them augment artificial symptoms such as the dermal reactions, none diminishes symptoms save adrenaline or pituitrin.

(III) SEROLOGICAL ABNORMALITIES (ALLERGY).—This aspect of our problem so strikes the imagination that it seems with many to crowd out all other points of view so that they may even want to call the diseases we are discussing, "the allergic diseases." In some at least of the toxic idiopathies this serological abnormality is very easily demonstrated, e.g. the hay fever patient is notoriously affected by grass pollen —whether it comes to him naturally (causing "symptoms") or is administered by a doctor (causing a "reaction"). Normally grass pollen is not poisonous, and the serum of a hay fever subject is equally non-poisonous; but grass pollen together with the serum of a hay fever subject makes an "urticarial mixture" which is poisonous to any normal man. The grass pollen, which has a special affinity for the serum of a hay fever patient, thus causing this toxic idiopathy, may be called the hay fever *idiotoxin*; the quality of the serum which produces the symptoms may conveniently be called the *idioceptor*.

Parallel demonstrations can be made in numberless other sensitization diseases: in horse-asthmatics with horse scurf, and similarly in the sensitizations to the dermal scales of any animal; in the egg-sensitive persons with white of egg, and similarly in sensitizations to any protein food; similarly again in sensitizations to any protein particles floating in the air—flour in a bakery, sawdust in a carpenter's shop, mould spores in a damp house, and so on endlessly. In fact, any animal or vegetable protein may act as an idiotoxin causing one or several of the toxic idiopathies when it comes into contact with the living tissues of the specifically sensitive person.

Artificial toxic idiopathies are produced whenever and wherever any of these idiotoxins are brought into contact with the living cells of a person with that particular sensitization, i.e. one who possesses the corresponding idiotoxin. Very conveniently a miniature artificial toxic idiopathy can be produced by pricking an idiotoxic protein into the skin of a person with the requisite sensitization, thus producing a localized urticaria and a surrounding erythema : this constitutes the well-known diagnostic cutaneo-reaction, and is an example of allergy. Which particular toxic idiopathy is produced by the action of any of the foreign proteins depends of course on its natural methods of ingress. Thus air-borne pollen affects the eyes and air passages, a prick of an idiotoxin into the skin gives local urticaria, and a food substance first affects the alimentary tract and thence gets into the blood stream; except for this question of ingress, the idiopathic manifestations will depend on other parts of our pathological machinery, e.g. the trauma factor (*vide* p. 566).

If we believe that one and the same pathological mechanism underlies all the toxic idiopathies, then specific sensitization to some foreign protein (or proteins), i.e. the interaction of idiotoxin and idioceptor, must play an essential part in all our groups. It is not so easily demonstrated with some of the proteins, for example, the bacteria (*see* Section IV). We do not know how sensitization is brought about, and it is an undue simplification to take the anaphylactic sensitization of a guinea-pig with horse serum as an exact parallel. Anaphylactic sensitization of the normal man with horse serum does not produce horse asthma. Hay fever cannot be induced in normal human beings or animals by keeping them in a hay-field all day long. The subject must not be pursued here; but there is clearly some factor at work of which we know little or nothing—certainly not enough to use the knowledge for treatment and so prevent possible sensitization with any stray protein.

Diagnosis of the idiotoxin may be deduced from the history of the case, or from direct experiment on the skin, or preferably from both combined. Skin tests to be valid must exclude any general toxic action of the suspected protein, or a general reactivity (e.g. dermographia) of the skin of the patient. A genuine positive reaction puts the patient in the category of sensitive persons who tend to suffer from the toxic idiopathies in general, but it may not indicate the idiotoxin from which his present symptoms are derived. It will be found that skilled questioning generally leaves few tests worth the making—save to confirm, or else to clear away, suspicions already formed by the patient or his friends. " Blind " testing gives useful allergic diagnosis scarcely once in a hundred tests, save with young children. Let us take just one example of the need for treading warily in the search for a peccant idiotoxin. Patients, if the leading question is put to them, generally say that food upsets them; but if asthma comes on only or chiefly at 7 a.m. it is useless to suspect some food, for symptoms would have been noted the evening before within an hour of ingestion. A toxic idiopathy can be produced by food in at least three other ways: (*a*) by bacterial growth in the food (Section IV); (*b*) neurologically by overloading the stomach (Section VI); (*c*) psychologically when the patient becomes fussy about some food; and many would add (*d*) by affecting metabolism in some undetermined way.

Treatment of the serological abnormalities can be effected in two ways: either by avoiding the protein irritant in question (the idiotoxin), or by diminishing or even removing the sensitization of the patient. The policy of avoidance, if practicable, is also obvious, but to afford the patient noticeable relief the considerations we have just been discussing under diagnosis must be borne in mind. With regard to practicability, some things are easy and some surprisingly difficult to avoid; thus horsehair and feather fluff are to be found in unsuspected places; unusual foods can be avoided, but wheat flour and white of eggs are difficult to evade.

Dust, particularly in houses, usually contains protein fragments, such as particulate matter derived from the industries, mould spores, animal scurf, and in their season the pollens—particularly that of grass. Some have gone so far as to construct gas-masks to avoid these, or sealed rooms have been supplied with filtered air only. It is probable that the chief beneficial effect of altitude is derived from the lessened capacity of the rarified atmosphere to support dust. (All these methods may also be credited with marked psychological effect.) In England grass pollen is universal at midsummer—and this even in the largest towns, since it will fly on the wind for thirty miles or so, even on the coast unless a steady wind is blowing off the sea.

There is obviously less pollen away from hay-fields, or in a room with shut windows where the dust has been allowed to settle. Railway carriages and motoring should be especially avoided because of the rush of pollen-laden air against the eyes; bad cases say that spectacles offer little relief, but conjunctivitis can be avoided at the cost of fastening watch-glasses over the eyes with adhesive strapping. Those who may travel can avoid the pollen cloud by journeying north or south; they may even be driven to cross the equator regularly in order to avoid the summer and its perils.

The well-known "locality" element in asthma, urticaria, migraine, etc., if capable of analysis usually signifies the presence of some special idiotoxin in that place. (Symptoms might, of course, be due to other parts of our pathogenic machinery; e.g. the psychologists frequently comment: "Notice—it was her *parents'* house which gave her the migraine," or "It was his *wife's* feather bed which gave him asthma.") When hunting for offending protein substances in a house, air-borne mould spores are a likely possibility—damp wall-paper or dry rot under the boards will produce spores by the million which are carried about by the internal air currents. Sometimes just changing the bedroom will make all the difference to an asthmatic, but it is better, of course, to tackle the protein irritant at source. When a town is suspected of producing a toxic idiopathy, a factor such as fresh-water mussels or water-weed dissolved in the water-supply is an obvious possibility—(fresh-water mussels will sometimes completely block big water mains—innocuously, save for the diminution of water, unless the subject happens to be mussel-sensitive. Usually the public health officers can give information.) For diagnostic skin-testing, the water can be evaporated nearly to dryness at 45° C. under a vacuum and the excess of salts dialized out.

The neighbourhood of stables or chicken-runs, and the dust incidental to the patient's trade or occupation should not escape attention, and suspicions can usually be confirmed or excluded by skin-testing. If no one substance can be implicated, the dust of the danger area can be collected (preferably in a vacuum-cleaner bag) and a watery extract of this tested by the prick or intradermal method; "reactions" with dust extract must be controlled with particular care. My experience is that the locality element, if it really represents an idiotoxin, will exercise all one's detective ingenuity and, whether diagnosed or not, is most frequently coped with by avoidance. One more possibility of avoidance may be briefly mentioned. Food which was previously inimical can sometimes be de-natured and so made tolerable, e.g. by hard cooking —this is often the case with eggs; again, it is related of the late Sir Hermann Weber, who was a marked food sensitive, that he could only tolerate wheat flour after it had been treated with strong acids which presumably de-natured it.

Desensitization, if this alternative is to be attempted, must likewise have been preceded by careful diagnostic work, for it is obviously necessary that the vaccine to be employed should tally with the idiotoxin producing some at least of the symptoms. It is not necessary that this should be the *sole* protein cause; and, as a matter of fact, if a given protein is an important enough contributor, its elimination may prevent other idiotoxins from being enough to produce symptoms. Here we have a very definite " addition and subtraction " effect; e.g. a cat asthmatic who is also a bacterial (bronchitis) asthmatic may, if the bronchitis is deleted, be thereafter able to stroke cats with impunity; or again, a horse-asthmatic who is also a hay fever subject may be able to ride on horseback save at the English midsummer. This subtraction effect is a definite encouragement to the reduction of protein factors one by one, so long as they are sufficiently important in the production of symptoms.

Desensitization can be carried out in two very different ways. (*a*) Mild (i.e. minimal) doses can be given and increased slightly on clinical evidence; or (*b*) bigger and bigger doses can be given at each re-inoculation till a relatively enormous dose is attained without producing symptoms. (There is an obvious parallel here with the small and the heavy dosings with tuberculin for tuberculosis.) As perhaps we know most about desensitization with doses of grass pollen for hay fever this will serve to illustrate the two methods.

(A) *Mild desensitization.*—If a patient is suffering natural hay-fever symptoms in June prophylaxis is difficult (though this might still be accomplished by " rush " inoculation, as will be seen); we may, however, resort to temporary therapeutic measures by inoculating from, say, 20 to 100 units at frequent intervals (2 to 5 days) as symptoms seem to demand. If such mild doses are commenced before the pollen season, i.e. before natural symptoms are possible, they are prophylactic and usually can be increased up to, say, 500 or even 1,000 units, thus approximating to the " heavy " desensitization to be described later. If unfortunately these rather larger doses do not prevent the onset of symptoms at the beginning of the pollen cloud, it is then usually better to return to the therapeutic doses of between 20 and 100 units given according to symptoms. This method, especially in the purely therapeutic form, seldom results in a complete " cure," but it generally gives relief, and sometimes so much relief that patients may roundly declare that they want nothing better. Whenever a specific protein is diagnosed—pollen, food, animal scurf, dust, or what not—this method may be employed; it is simple, safe, and sometimes surprisingly efficacious. Above all, it is apparently the only desensitization method possible where a bacterial protein is suspected, as will be described later (Section IV). The last twenty years have shown (e.g. in hay fever) that this mild method does to a considerable extent ameliorate the disease in succeeding years and shortens the time required by the sufferer to " grow out of " his affliction.

(B) *With heavy desensitization* a cure can almost safely be promised if one is sure of the preliminary investigations; but it is necessary to give the warning that the trouble of the treatment may possibly be considered by the patient worse than the symptoms. Thus it comes about that " bad cases get cured, slight cases do not." Again taking hay fever as our model, we start if possible well before the summer season to avoid the complication of the pollen off the fields. The initial dose is as big as possible, say from 20 to 100 units, according to the past history of the case and according to the intensity of the diagnostic skin reactions ; the next dose is bigger, the next bigger again, and so on. At first one may advance possibly by 100 per cent., 50 per cent., or 20 per cent., but by the time one reaches a 200-unit dose it is generally advisable with cases being desensitized for the first time not to increase by more than 15 per cent. In this way—after about 50 re-inoculations—a dose of, say, 50,000 will have been reached (representing enough of the yellow pollen grains to cover a shilling handsomely), the patient's diagnostic skin reactions will be abolished, and hay-fever symptoms will not supervene. It is as well to arrive at this result at the crisis of the hay-fever season (June 20 in the south of England) or " maintaining doses " will have to be employed. Similar treatment can be done equally well with animal scurf (e.g. horse dandruff), food substances (e.g. egg or fish), or with any other protein extract—even extracts of dust containing unknown idiotoxins. Usually with these other substances (e.g. egg or horse-scurf) fewer doses, i.e. a final dose of say, 5,000 or 10,000 units is ample—as may be verified by the disappearance of skin reactions. If the effect is to last, " maintaining " doses will probably be necessary.

We have a wide choice in the frequency of re-inoculation during this heavy desensitization method, but it is advisable that intervals should not be longer than a fortnight nor shorter than two hours. Inoculations about once a week have been called the " leisurely method," once or twice a day " intensive," and many doses a day has been called " rush " inoculation. In the "rush" method it is economical in time and very desirable for safety to have the patient in a nursing home or hospital; though the patient is not made ill, it is generally found to be a "whole-time job" for him; it can usually be put through in the inside of a week and is the only practical radical method if there is no spare time, e.g. during the hay fever season in June. The intervals between the inoculation doses may be varied at will—leisurely, intensive, or rush, e.g. two or three days of a rush may be used to supplement a more dilatory method.

(IV) BACTERIAL INFECTIONS are not really a separate part of the causal machinery, but they affect it in such diverse ways (becoming thereby so important from the point of view of treatment) that it is convenient to discuss them here separately, though in the main they fall into the section we have just been discussing, i.e. as providing the idiotoxin in our mechanism. If such is the case then the sufferer is in the position of a hay fever patient with a patch of grass growing in his inside. Every one knows that attacks of asthma or of rhinorrhœa may repeatedly follow "colds" in the head or attacks of slight bronchitis; the asthma which occurs only or chiefly in winter is usually of this nature. Urticarias, "prickly heats," eczemas, etc., which often occur chiefly in the warmer months, can perhaps be more often traced to gut infections—either of pathogenic streptococci, of abnormal coliforms, or both. Migraine often, and I think epilepsy, too, can be traced to fluctuating, but chronic, infections of the gut, air-passages, or genito-urinary system. Ichthyosis, a minor toxic idiopathy, which in various degrees of intensity is of surprisingly common occurrence in an "asthma" clinic, often clears up tó the astonishment of the dermatologists, when some other toxic idiopathy is being treated by tackling the bacterial factor. The investigation resolves itself into the familiar bacteriological procedure of hunting for that septic focus which may be accounting for the repeated infections, or of isolating the organisms believed to be responsible for some present infection.

Diagnostic skin tests can be carried out by watery extracts of the isolated bacteria; these are well worth making but, unfortunately, are not too reliable. Discretion must therefore be used in their interpretation, and diagnosis may have to be made rather by exclusion of other protein irritants.

Those most important groups of the idiotoxins, the bacteria and the moulds, give as a rule comparatively poor skin reactions; idiotoxic food substances give rather larger, though usually still small, reactions; dermal scales of animals give considerably larger reactions, and the pollens (particularly that of grass) give the largest of all—and this apparently without reference to the degree of troubles they may be causing the patient. In addition to this difficulty bacterial extracts are bacterial endotoxins, i.e. they are toxic and may cause a reaction in the normal man which must be discounted when estimating and interpreting the reaction in our patient. Furthermore bacterial extracts often cause delayed reactions, i.e. they may appear next day instead of in the normal ten minutes of a toxic idiopathy; this is presumably the infection rather than the sensitization factor.

Treatment.—We are aiming at a large target; there is the infection as well as the sensitization to be considered, there are the numerous ways in which these two affect the causal machinery of the toxic idiopathies, and the way they react on each other. It is sometimes not fully realized that a bacterial toxæmia always affects the psychological outlook, from acute mania in a fever delirium down to the perhaps not so conspicuous, but just as important, depression, anxiety, and irritability of chronic bacterial toxæmias. It will be seen in the psychological section of this paper how this may directly affect the toxic idiopathies. Again a vicious circle is set up, for a poisoned brain leads to poor physical coordination, e.g. constipation, which thus may increase the poison which is causing it. For the ways in which bacterial infections may affect the vasomotor and trauma factors *see* Sections VI and VII.

If there is a definite focus of infection from which the bacterial poison is spreading, it is, of course, desirable that this should be removed—due care being taken concerning the very real danger of spilling of poison during the removal: thus the tendency to a toxic idiopathy is at least an additional reason for the removal of septic teeth. But apart from the difficulty that the suspected focus may not easily be eradicated (e.g. the throat, the gall-bladder, a long section of gut), there is the probability that it does not really stand alone, since the main factor which has permitted the development of the focus—an immunological lack—is general and not local in its effects.

If a bacterial vaccine is to be employed (either autogenous or stock) there is a natural desire to press the infection hard and so reduce it or drive it out of existence; but first, at any rate, it must be treated as the idiotoxin. Doses of a vaccine adjusted for a toxic idiopathy must be much smaller than would be normally used for an infection. If this desensitization treatment gives the desired results then the doses may be pressed up to more normal proportions (with a careful watch for the return of the toxic idiopathy) and then the infection itself can be coped with. Perhaps one-fifth down to one-tenth of the usual doses should be given, e.g. the optimum dose of a streptococcus vaccine for, say, asthma or angio-neurotic œdema should be under a million and often very successful doses do not go above 400,000 cocci. It is useful, as adding to the confidence and comfort of the patient, to mix in with the dose in the syringe a minimal quantity of adrenaline, say 0·05 c.cm. or one minim of the 1:1,000 extract; this checks the tendency to immediate reaction. Note that all this is on the plan of the "milder" and less radical desensitization discussed in the serological abnormalities section, where it is illustrated by small therapeutic doses of grass pollen to hay fever subjects. The heavier method of desensitization which was then described is, according to my experience, and I think that of most people, not suitable when dealing with the bacterial cause of a toxic idiopathy—perhaps because they *are* infectious and the amount of bacterial idiotoxin must be influenced by the treatment. However, the above recommended " mild " inoculations work rather well if all the pros and cons are carefully weighed before they are embarked on; I would be inclined to say, perhaps because of the multiplicity of points at which bacteria attack the causal mechanism, that of all treatments these mild bacterial vaccines give most relief of all when we consider the toxic idiopathies in bulk.

(V) THE PSYCHOLOGICAL FACTOR is one that can hardly be missed if many patients are allowed to say what they wish about the incidence of their attacks. The toxic idiopathies often begin gradually, but sometimes the first noticeable attack of, let us say, asthma, urticaria (particularly of the angio-neurotic œdema type), or of paroxysmal rhinorrhœa, are dramatic events which are well fixed in the memory; perhaps in the majority of such cases the attack is, by the patient, put down to some emotional cause. Twenty-four years ago I felt I knew a great deal about hay fever —it was just caused by grass pollen; I well remember my resentment when patients insisted on ascribing the first and subsequent attacks to some strong emotion—love, death, music, financial ruin, going to a dance, a dog-fight, missing a train, and so forth. Relatives of an asthma patient often declared " We daren't make him laugh because it always brings on an attack."

The fact must be recognized by even the most materialistic of us; but the psychological specialists often go much further by regarding the toxic idiopathies as merely one of the pathological ways in which emotional tension may find discharge—like having a good cry; taking the electric current as an illustration they might say that some people at some times find an undue resistance to the discharge of emotions through consciousness via the long normal circuit of the cerebral cortex and the central nervous system generally; they therefore "short" through one of the regular physiological functions instead of experiencing the emotion consciously. And when normal physiological functions are used in this way they become pathological. The psychologists say that what particular short-circuit mode of discharge the individual patient employs, i.e. what physiological function he throws out of gear, depends on organic peculiarities (such as, e.g. this inheritance of tendency to the toxic idiopathies), or else it depends on the psychological significance of the function (e.g. dyspnœa, which is symbolical of being mentally stifled or shut in). If this is true then it follows that in removing by our treatment the physical peculiarities we may be cutting off that path of discharge and thus make the emotional tension worse than ever. In corroboration of this a patient volunteered to me the statement that whenever I made the asthma better (by minute doses of a catarrhal vaccine) her "horrors" got worse. The patient was an artist and "the horrors" consisted in unpleasant dreams and a compulsion to see and paint queer symbolical pictures of imprisonment and attempts at escape. She said she preferred the asthma. For some little time I had noted this apparent effect of my treatment, but had not mentioned it to the patient.

The psychologists, while rightly insisting on the importance of their own side of the subject, may confess bland ignorance of, or even disbelief in, the other parts of the pathological mechanism which we have been discussing, and when pressed in argument they may be driven to claim that everything physical (the agglutination reaction in typhoid fever, for example) is all due to psychological causes: the fact is that, like other specialists, they find it difficult to see the wood for the trees—but their trees are there all the same. I find it easy to believe the story of a martyr to hay fever who had been psycho-analysed for some (apparently) quite different trouble and was very surprised and delighted next June when the anticipated rhinorrhœal or conjunctival symptoms did not show themselves; the analyst had not been aware that the patient had ever had hay fever.

Treatment.—I am not here advising indiscriminate psycho-analysis for all the toxic idiopathies; but the emotional aspect deserves consideration even from the non-psychologist. It may, I suppose, be said that wherever there is obvious mental instability, such as might possibly benefit from mental treatment in any event, the presence of a toxic idiopathy is an additional reason for seeking advice from a psychological colleague. Short of this a good deal can be done by all of us. For instance, small children can be greatly helped by a placid demeanour on the part of mothers, nurses, and doctors; emotional fathers can be forbidden the nursery till they can control themselves and refrain from suggesting illness to their children; it is better sometimes to take the risk of sending boys to school rather than make them abnormal by "taking every care of them." Toxic idiopathy patients are all very amenable to suggestion: the knowledge that "all the resources of civilization" are to be used in the ward of a hospital will often end an obstinate attack of asthma before the eminent physician can make up his mind what to try first. Conversely, if a patient "always gets asthma in Salisbury" he probably always will. We are told that "the best cure for asthma is not to have it" —the worst predisposing cause is having it, and the same thing is true of the other toxic idiopathies. The rule seems to be that, while using the suggestion of cure as wisely as possible, great care should be taken to avoid fussing or hospitalizing a patient.

Shock treatment.—The "suggestion" element can, of course, be used to justify any treatment whatsoever, and shock treatment may very reasonably come under this head. To produce the shock the intravenous injection of peptone was formerly popular, but almost anything sterile will do, e.g. the subcutaneous injection of cow's milk (taking care, of course, that the patient is not specifically sensitive to this foreign protein), the intramuscular re-inoculation of 5 to 10 c.cm. of the patient's own blood immediately after drawing it off from a vein, or the intravenous injection of the oil and sulphur mixture so popular on the Continent; I find that a shock with a very suitable rigor can conveniently be produced by injecting intravenously 50 to 100 million of stock typhoid vaccine. I believe that if a sharp thrashing with a cane could only be served up in a sufficiently medical guise it would give a very efficient shock, just as when an experienced nurse gives a grizzling child a good slapping as "something to cry for." It is difficult to say here where non-specific immunization ends and psychological treatment begins—possibly with many of the above mentioned injections there is a mixture of the two.

Under the heading of mild psychological shock seems to come the very popular remedy of burning medicinal powders, papers, and cigarettes; I have found that if brown paper is dipped into supersaturated saltpetre and then dried it is as good as any other smouldering paper—or as useless. Similar to this is the smoke of towns or the sulphur of the old underground railway. A good copper-tasting pea-soup London fog is claimed to be an "infallible cure" by many men, but women usually say fog brings on an attack of asthma—I think because it frightens them. We may conveniently add to the above the various inhalation treatments, with the proviso that the inhalant may very well act on the vasomotor mechanism medicinally also; their alleged anti-bacterial action is worthless.

(VI) THE VASOMOTOR MECHANISM in the toxic idiopathies is so obvious in many cases that the neurologically minded often claim that the whole phenomenon is a vasomotor reflex and should be treated as such. Even the cutaneo-reaction, which we must remember is a miniature and artificial toxic idiopathy, is dependent on the nerve reflex arc being intact; if we break that reflex by anæsthetizing the skin or cutting the nerve no reaction can result from the diagnostic idiotoxin on it. This nerve reflex action is naturally more clearly seen in the strictly localized toxic idiopathies, such as asthma and paroxysmal rhinorrhœa ("vasomotor rhinitis"). I suppose every asthmatic has found by experience that an overloaded stomach or bowel will bring on an attack ; this dread of food by the patient is often wrongly taken as evidence that there is a specific sensitization to some food protein, and has resulted in much fruitless or misleading search for imaginary idiotoxins by cutaneo-reactions; such people eat heartily when asthma is not threatening, i.e. when the other parts of the mechanism are not present. Afferent nerves from the nose will notoriously set going the necessary vasomotor reflex; in fact, a particularly sensitive area on the upper and back part of the septum has been called the " asthmogenic centre." Any hay fever patient will explain that the stimulus of sudden bright light in June will start the dreaded symptoms, or one may tell you that *any* strong smell will start him off when there is pollen about. Tickling the endings of afferent nerves is one of the three ways in which bacterial sepsis of the air-passages or bowels can " cause " a toxic idiopathy (as shown in Section IV the other two ways in which bacteria work are as an idiotoxin and as trauma to the site).

We may now perhaps connect up with the preceding piece of our mechanism (i.e. the psychological) by noting that different impulses may set going strong emotional states—as can be vouched for by anyone who, in the middle of the night, has a tickling " asthmogenic centre " on the nasal septum, and this whether or no he suffers from any toxic idiopathy. Conversely we may ask how the neural stress generated in the form of emotion can possibly influence blood-vessel or bronchiole save by the efferent nerves.

Treatment.—If a definite nerve reflex arc can be made out in any toxic idiopathy, treatment may very reasonably be along neurological lines which should always be borne in mind in considering a case. Peripheral terminations of sensory nerves can be shielded from "tickling" by surgical rearrangement, e.g. straightening the septum of the nose or removing polypi; the nerve endings can even, in special circumstances, be extirpated by the knife or cautery. The optic nerve can be shielded by Crookes' glasses in strong sun. In some areas sensations can be deadened locally by cocaine, anæsthesin, carbolic sprays, etc.; the reflex arc can be broken by narcotics, such as morphine or even a general anæsthetic. Some of these expedients are clearly only temporary, and it is well to give adrenaline simultaneously to dilate the bronchioles, otherwise e.g. with morphine, one may asphyxiate the patient by giving tolerance to the distress without providing adequate breathing facilities. Against overloading the stomach just before going to bed or at any time, it is hardly necessary to warn patients.

Bromides and drugs, such as luminal, which are such a standby in epilepsy, are of equal utility (or inutility) in the other toxic idiopathies. They are mentioned here because they may be regarded as narcotics from their connection with epilepsy and migraine; but it is at least possible that they act on our mechanism by way of some metabolic factor.

(VII) TRAUMA is a factor which may determine the manifestations of the toxic idiopathies to a particular site. Presumably it always comes into play to some extent, but occasionally it can be very clearly seen in operation. In dermographia, which tends to be inherited along with the toxic idiopathies, the part played by local injury is so marked as to be "the whole story" in most people's estimation, though the other parts of our machinery are really necessary for the reaction. Eczema tends to show itself where damage has been done, e.g. in the folds of the elbow and knee; I have seen the triangular areas of a woman's thigh which had been rubbed by the suspenders accurately mapped out in eczema; or again the damage done to some very sensitive skins by strong sunlight may result in urticaria or "actinic" eczema. A child who has had eczema for many years is likely to change to asthma after pneumonia, whooping-cough, or measles has damaged the bronchioles. The argument must not be elaborated here, but the same holds good with migraine, epilepsy, paroxysmal hydrarthrosis, angioneurotic œdema, and so forth. Perhaps the best demonstration is afforded artificially when an overbold desensitization dose of an idiotoxin is injected and the tendency to some toxic idiopathy is broadcast over the whole body; in these circumstances damaged areas are selected by preference—the sites of old boils, hot fomentations, blows on the skin, pinchings, or pricks.

Treatment.—When desirable along these lines, this will consist in eliminating or mitigating the trauma. Areas that are open to mechanical damage can be protected. Perhaps the most practical point for us is the elimination so far as may be of the catarrhal or infective element in the air-passages and lungs in the case of asthma. This was mentioned when discussing the neurological aspect of our syndrome; in fact, it may be conceded that the damaging of an area of the body and stimulating the afferent nerve endings in that area naturally go hand in hand. Whether a bronchitis acts by stimulating nerves, or damaging the area, or by the bacteria themselves providing the idiotoxin, the treatment is the same : very minute but frequent doses of a bacterial vaccine—either stock or autogenous.

CONCLUSION

All this makes a formidable list of points to be considered before the practitioner selects his line of treatment, or decides whether or no he shall seek help from any particular specialist. The specialist, by the necessity of his calling, works in blinkers and will see the desirable line of action straight in front of him, but he, too, should be trusted to realize that the toxic idiopathies have a complicated causal mechanism.

As for *treatment*, we have here a happy hunting-ground for random therapeutics in an attempt to remedy these hypothetical abnormalities. Though barley sugar or hydrochloric acid have their warm advocates, the evidence for them is empirical and (to me) unconvincing at that. Perhaps we should bow acknowledgment of our great debt to adrenaline, and secondly, to ephedrine; but, until we know exactly what fundamental part of our pathogenic machinery they are affecting, however helpful they may be we must still regard their use as symptomatic treatment. It is preferable to use small injections of adrenaline repeatedly rather than one "heavy shot"; my standing orders in hospital are one-twentieth to one-tenth of a cubic centimetre of the 1 in 1,000—given every twenty minutes if necessary, though, of course, larger doses at longer intervals may have to be given to suit particular cases. For example, half a cubic centimetre of adrenaline or even more, combined with one-sixth of a grain of morphine will often break an obstinate attack of asthma. With regard to the repeated small doses, we might nowadays trust suitable patients to inoculate themselves under general medical supervision—but only with adrenaline. Very many, of course, do this already with or without their practitioner's knowledge; it seems to be impossible to acquire a drug habit thereby, and with small doses the relief to the patient by far outweighs any possible harm.

Under "metabolism" we may mention the so-called proteose therapy. This was based on the erroneous idea that the specific idiotoxin was eliminated in the urine, and that this could be recovered and used as a vaccine. The chemically heterogeneous substances thus isolated as "proteoses" are toxic as one might expect, but are not specific when tested on the skin; it seems probable therefore that any amelioration of symptoms following proteose therapy may be ascribed to its psychological effect.

THE DELAYED TREATMENT OF PERITONITIS COMPLICATING APPENDICITIS*

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WHEREAS the removal of the intact appendix is associated with an almost negligible death-rate, the moment that the complication of peritonitis occurs, the mortality shows an appalling rise. Sworn and Fitzgibbon[1], in a series of 226 cases of appendicitis with diffuse peritonitis in St. Thomas's Hospital, showed a mortality of 21·1 per cent., the causes of death varying from toxæmia, paralytic ileus, mechanical obstruction, dehydration, to more remote complications, such as empyema and pneumonia. These cases were all seen and operated upon within four days from the onset of symptoms. The same report contained a series of 487 cases with a palpable mass at the time of admission, and a death-rate of less than 4 per cent. When it is noted that the vast majority of this second group were well beyond the four-day period when first seen, these figures have a very obvious significance.

As long ago as 1902, Ochsner [2] realized the importance of allowing the peritoneum to deal with infection in its own way without precipitous surgical interference, and advocated conservative treatment of cases of appendicitis with peritonitis until a well localized abscess had formed. Sherren[3], who was convinced of the value of this method of treatment, first advocated it in 1905 and thereafter used it consistently for many years. In 1926 Le Grand Guerry[4], in a paper on the "Mortality of appendicitis," reported 85 cases with acute diffuse peritonitis operated upon at once with seven deaths, a mortality of 8·2 per cent., and 123 cases with acute diffuse peritonitis in which operation was deferred, with two deaths, or a mortality of 1·6 per cent.; on these irrefutable figures he entered an earnest plea for the adoption of the delayed method of treatment. McNeill Love[5] in 1924 was strongly in favour of the delayed treatment in cases of general peritonitis, but more recently[6] appears to have somewhat modified his views on this subject, for though advocating delay in those cases in which peritoneal infection is definitely limited to the right iliac fossa, or in which a localized abscess is present, he states that "in cases of general peritonitis appendicectomy certainly appears to be the rational treatment." Hamilton Bailey[7], like Love, has followed many of Sherren's modifications, such as allowing water by mouth, in the detail of the treatment. He lays stress on its use in late unperforated cases, and in cases with an already localized abscess, but definitely excepts generalized peritonitis as an indication, though later allowing rare concessions in these cases.

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The whole rationale of the treatment was originally evolved by Ochsner for cases with definite peritonitis, and these are the cases, and not those with a still unperforated appendix or an already localized abscess, in which the mortality is so high when immediate operation is undertaken. It is to show the value of the delayed method of treatment, when carried out in detail precisely as Ochsner advocated, in spreading and general peritonitis, that this study has been made.

A careful analysis was made by Coller and McRae[8] of all the cases of acute appendicitis treated at the University of Michigan Hospital, U.S.A., from 1925 to 1930, during which period immediate operative treatment of all acute cases, including those with peritonitis, whether localized or generalized, was the rule. They divided the cases in which the infection had involved the peritoneum into two groups: (1) local peritonitis (not including formed abscess), in which the mortality was 1·17 per cent., and (2) general peritonitis, in which the mortality was 52·6 per cent. With the first group, the cases in which there is an early and localized peritoneal infection, this article is not primarily concerned. It is extremely doubtful if delayed treatment in these cases is preferable to immediate operation, and in any case it is by no means always possible to make a sure pre-operative diagnosis between an acutely inflamed intact appendix and one with really early localized peritonitis. A history of a sudden brief period of comparative freedom from pain, followed by the return of the pain indefinably different in character, strongly suggests perforation, but the physical findings give little help. In both cases there is well-marked tenderness over the cæcum and muscular spasm of the right rectus. Though the pulse-rate may tend to be higher in the case of perforation with early and local peritoneal involvement, this is such a variable factor as to be of no real differential value. The temperature, again, may be slightly higher in the one, but it is equally likely not yet to have risen above 100° F., and the presence or absence of an area of hyperæsthesia of the skin in the right iliac fossa is, as demonstrated in this series, a quite unreliable sign. Since, therefore, the accepted treatment of acute unperforated appendicitis is the immediate removal of the appendix, and since the difficulty of distinguishing these cases with any certainty from those within the first hour or two after perforation is apparent, these latter must continue to be treated by prompt operation. And if the peritonitis is really early and still localized, the results are satisfactory. Of the 85 cases in this class of Coller and McRae's study, there was only one death, a patient with advanced pulmonary tuberculosis, who died a few hours after appendicectomy under local anæthesia.

It was on account of the appalling mortality, 52·6 per cent., in the second group, cases which had on admission, all the clinical signs of an acute diffuse peritonitis, that in 1931 immediate operation, with or without drainage, was abandoned, and the delayed treatment of such cases adopted.

The present series is admittedly short, covering only one year, from January 1 to December 31, 1932, but it is, I think, convincing, when contrasted with Coller and McRae's studies in the same hospital, under the same conditions, save that the Ochsner treatment was substituted for immediate operation when the peritoneum had become widely infected. During this period 23 cases were admitted and diagnosed as appendicitis with diffusing or diffuse peritonitis (*see* Table I). All were treated conservatively. In 13 cases a localized abscess developed which became palpable and was drained at varying periods between the fifth and seventeenth days after admission, the appendix being removed at the same time only in those cases in which this could be done without risk of spreading the infection. When the appendix was left, the patient was strongly urged to return for appendicectomy in three months' time. In nine cases there was not any abscess, but subsequent appendicectomy in eight of these revealed perforation of the appendix and signs of recent localized peritonitis. The remaining patient has not yet returned for operation. There was one death in this series, giving a mortality of 4·3 per cent. This does not include one patient who was completely

TABLE I

——	Cases	Abscess Drained	Complications	Mortality	
				Deaths	%
Diffuse peritonitis -	23	13	3	1	4·3
Localized peritonitis (with palpable mass).	12	11	0	0	0

moribund upon admission and died within three hours. The three complications shown in Table I were: 1 paralytic ileus, 1 subphrenic abscess, and 1 thrombophlebitis. Table I also shows 12 cases in which at the time of admission a mass in the right iliac fossa was palpable either per abdomen or per rectum. The majority of these were treated conservatively for a few days until the mass became less diffuse and it was felt that the abscess was well walled off. Eleven of the twelve were then drained, the appendix being removed at the same time where feasible. In the remaining case the mass rapidly subsided and the patient was discharged to return for appendicectomy in three months' time. There were not any deaths or complications.

TABLE II

——	Maximum	Minimum	Average
Age - - - - - -	61 years	4 years	20 years
Time since onset on admission	8 days	48 hours	3 days, 12 hours
Temperature on admission -	104·0°	98·6°	101·0°
White blood count on admission	67,800	11,500	21,000
Stay in hospital - - -	70 days	6 days	26 days

Table II is a more detailed study of the 23 cases with spreading or general peritonitis. The average age of 20 years is perhaps a little misleading, owing to the inclusion of three cases over 50 years of age; without these the average age was 16 years, a figure which presents a truer picture of the decade most frequently affected. The average time since the onset of symptoms when admitted to the hospital was 3 days, 12 hours. In the child, as is well recognized, perforation is liable to occur at an early stage of the disease, even within a few hours from the beginning of the attack. This may be due partly to the extremely thin wall of the appendix in childhood, and partly to the comparatively large amount of lymphoid tissue present in early years, in which the infection spreads with great rapidity. In the adult, however, few appendices become gangrenous or perforate earlier than 48 hours from the onset of symptoms. It is consequently during the third or fourth day that cases with established peritonitis are usually seen.

The temperature on admission, which works out at an average of 101° F., is perhaps a little lower than would be expected, especially with the mean time since onset approaching the fourth day. It, however, bears out the axiom that if the infection is still confined to the appendix the temperature rarely exceeds 100° F., whereas if the peritoneum has been involved for more than an hour or two, the temperature is seldom below 100° F.

The leucocyte count—usually about 14,000 or 15,000 in acute appendicitis without perforation, and around 20,000 or above when peritonitis is present—is a useful but not entirely reliable guide. Given a good reaction on the part of the patient, the rising leucocyte count is a fairly consistent indication of an increasing area of infection, but if the patient is not reacting to the infection, the peritoneal cavity may be widely involved and the white blood-cells number no more than 8,000. As a rule, however, with a diffusing peritonitis a leucocyte count of 20,000 to 30,000 is to be expected.

An average stay in hospital of 26 days may seem a long time, but when it is considered that we are dealing with a condition which, when treated by immediate operation, has an exceedingly high mortality, and amongst the survivors a large proportion of complications demanding months of convalescence, surely the few additional days in hospital seem a small price to pay for the life and health of the patient.

DIAGNOSIS

Whatever may be the opinion of the individual surgeon on the best line of treatment to adopt, there is rarely any difficulty in the recognition of the presence of diffuse peritonitis. The attack has started three or four days previously and, as has been pointed out by many writers, in the vast majority of cases there is a history of a cathartic having been taken after the onset of pain. On admission the patient looks drawn, anxious, and acutely ill—the well-known peritoneal facies. The tongue is dry and coated, the pulse rapid, and the temperature is above 100°—often 102° or 103° F. Respiration is almost entirely thoracic, the abdomen scarcely moving. Almost invariably there is very definite spasm of the abdominal muscles on the right side, the spasm on the left being more or less well marked, according to the extent of the spread of the infection at the time. The sudden relief of pain and the relaxed abdomen which sometimes heralds the onset of peritonitis will never be found after peritonitis is established. It occurs in gangrene of the appendix at the time when the nerve endings in its walls have been destroyed, and immediately prior to infection of the peritoneum. Rectal examination reveals a generalized tenderness most marked on the right side. The leucocyte count, as already shown, is high—15,000–20,000 or even more.

Such a picture is only too familiar, and generally viewed with grave foreboding. The only too frequent sequelæ to operation may be visualized: the abdomen with one or more drains in it, or boldly closed with no drain at all, but in either case becoming more and more distended; the surgeon faced with the burning question of whether to do an enterostomy or not, and if so, when; the rapid sinking of the patient despite transfusions, cardiac stimulants, oxygen; or, if the immediate infection is survived, subphrenic abscess, empyema, adhesions and so obstruction once again.

It is in just such cases that the delayed treatment is of the greatest value, and it is in just such cases that this treatment has reduced the mortality in this clinic from 52·6 per cent. (or even if the five patients in Coller and McRae's series who were moribund on admission are deducted, 21 per cent.) to 4·3 per cent. Other recent figures for the operative treatment of appendicitis with general peritonitis also show a death-rate around 20 per cent.—Sworn and Fitzgibbon[1] 21·1 per cent., J. M. Black[9] 18·8 per cent., whereas the lowest mortality ever published in these cases—Le Grand Guerry's 1·6 per cent.—was obtained, as has previously been mentioned, by conservative methods.

TREATMENT

The delayed treatment as practised in this hospital differs scarcely at all from that originally laid down by Ochsner. The patient is immediately put to bed in the semi-Fowler position with hot flax-seed poultices to the abdomen. Nothing whatsoever is given by mouth. It is this vital point that many who follow the treatment in other respects apparently consider unnecessary, and it is on this very point that Ochsner has laid the greatest stress. He points out that the appendix is " virtually surrounded on all sides, except medially, by relatively fixed tissues," the cæcum, the parietal peritoneum and the peritoneum covering the iliacus muscle. On the medial side are the small intestines, and it is in great part the mobility of these that is responsible for the spread of infection throughout the peritoneal cavity. If the small bowel can be put and kept at rest, further spread of the infection will cease, and localization can and will take place. The introduction of even a teaspoonful of water into the stomach is enough to start reflex intestinal peristalsis. Ochsner goes even further. On the ground that stomach contents from food ingested before admission, or from regurgitation from the bowel, have the same effect, he advocates washing out the stomach at the commencement of treatment. In the cases in the present series this was rarely considered necessary, as the majority of the patients who had tried to take anything by mouth had been unable to retain it.

Fluids are supplied intravenously and subcutaneously. As a rule, and especially if there has been much loss of chlorides by vomiting, an initial 2,000 c.cm. of normal saline is given, after which 5 per cent. glucose is substituted, bringing the 24-hourly intake up to 5,000 c.cm. Morphine sulphate, gr. $\frac{1}{6}$, to produce rest and to aid in preventing peristalsis, is administered as required. This routine is continued until the temperature, which usually starts to fall within 12 hours, is flat and there is clinical evidence that the infection has been localized. If troublesome distension arises, it can usually be relieved by heat to the abdomen and a rectal tube. In the average case the first 24 hours sees a vast improvement in the patient's general condition. The temperature and pulse drop, the tongue becomes moist, the abdomen soft save for spasm and tenderness over the region of the appendix, and the patient says that he feels much better. Within three or four days the temperature is steady below the 100° F. mark, the pulse around 80, and an indefinite mass begins to be palpable in the right iliac fossa. A daily rectal examination with the finger should be performed as the mass can sometimes be more easily palpated by this route. About the third or fourth day it is often possible to begin fluids by mouth.

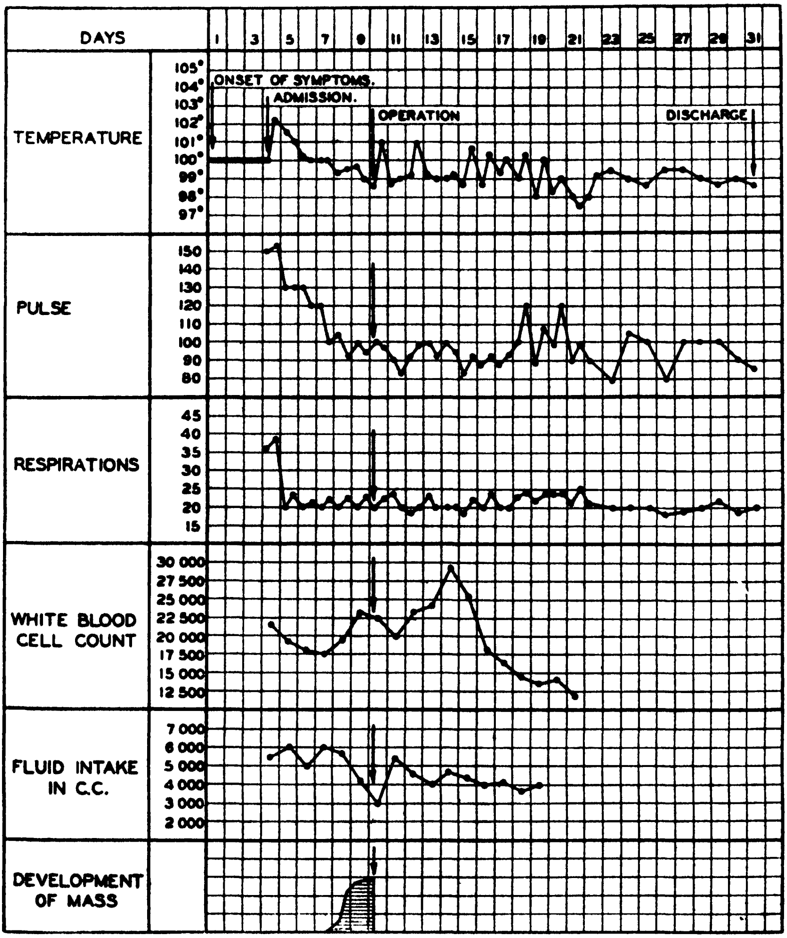
Contrary to Ochsner's teaching and to the custom of the majority of those who have since employed this technique, the abscess is drained as soon as it is considered to be sufficiently walled off. This is usually about the sixth to the twelfth day. A small muscle splitting incision is made over the mass, the peritoneum opened, the abscess entered with the finger and the pus sucked out. The appendix, as has been indicated, is removed only if this can be done without disturbing the walls of the abscess. One or two cigarette drains are then placed into the cavity and the wound lightly closed around them. In the majority of cases—13 in the present series—1 to 12 ounces of pus are evacuated. In a small number of cases the mass is found to consist of omentum and there is no pus. If no palpable mass develops, or only a small one which is definitely subsiding a week after admission, the patient is discharged as soon as his condition permits, and urged to return for appendicectomy, as are also those who are drained and the appendix not removed, in three months time. It may appear superfluous to point out that the Ochsner treatment is not a medical but a surgical treatment, and as such cannot be efficiently carried out in the home by the general practitioner. The patient must be admitted to hospital under the personal care of the surgeon. He requires constant and careful nursing and must be treated as the surgical emergency that he is.

CASE

The following case has been selected advisedly, for though there was the usual response to the treatment, it was unique in that the girl returned within two months with a second attack of acute appendicitis, the appendix not having been removed at the time that the abscess was drained. This serves to emphasize the importance of the patient's returning at the earliest reasonable opportunity for appendicectomy where this has not already been performed.

A female, aged 15 years, was admitted on March 23, 1932, with a chief complaint of pain in the abdomen. There was a history of acute onset of pain in the abdomen three days before admission, followed by some nausea and vomiting. A few hours later the pain settled in the right iliac fossa. A dose of salts was given. On the day previous to admission the pain in the abdomen ceased for a few hours but soon returned as generalized abdominal pain much more severe than previously.

Physical examination on admission revealed an acutely ill girl of about the stated age. Temperature 100° F., pulse 118, respirations 36, leucocyte count 21,000. Tongue—dry and furred. Heart and lungs—essentially negative. Abdomen—respiratory movements of the abdomen were absent, some distension, generalized spasm and tenderness, most marked in the lower part and on the right. No tenderness in the costo-vertebral angle. Diagnosis: Ruptured appendix, peritonitis. Treatment: Bed in semi-Fowler position, heat applied to abdomen. Nothing by mouth. Intravenous 5 per cent. glucose, approximately 5,000 c.cm. daily. Morphine sulphate, gr. $\frac{1}{6}$ p.r.n. The fall in the temperature and pulse-rate, the fluid intake, and the variations in the white blood cell count, can best be appreciated by reference to the accompanying chart. Forty-eight hours after admission.—Small amounts of water allowed by mouth in addition to intravenous 5 per cent. glucose. Third day.—Vomited once. Fourth day.—Abscess palpable per rectum. Seventh day.—Abscess drained and large amount of pus evacuated. Intravenous 5 per cent. glucose thereafter supplemented fluid by mouth until the seventh day after operation, when sufficient was being taken by mouth alone; on the same day the drains were removed, and on the 21st day after operation the patient was discharged with the wound healed. Two months after her operation the patient was readmitted with another attack of acute appendicitis, at which time the appendix was removed.



SUMMARY

1. Appendicitis when complicated by peritonitis which has progressed beyond the very early and

localized stage has a mortality shown by recent figures to be around 20 per cent.

2. The lowest mortality ever published in cases of appendicitis with acute diffuse peritonitis is 1·6 per cent., obtained by Le Grand Guerry, using Ochsner's delayed method of treatment.

3. Other advocates of this treatment have by its use obtained results infinitely superior to those obtained by immediate operation.

4. The mortality in these cases at the University of Michigan Hospital, under operative treatment, was shown by Coller and McRae to be 52·6 per cent. or, excluding those moribund on admission, 21 per cent.

5. A series is presented showing the mortality of appendicitis with diffusing and diffuse peritonitis at the same hospital, since the adoption of the delayed treatment, to be 4·3 per cent.

6. The diagnosis and the treatment by the Ochsner method are discussed, and stress is laid on the importance of forbidding the patient to take anything whatever by the mouth for the first two or three days, and of maintaining the body fluids at a high level by intravenous and subcutaneous infusions.

7. A case treated by the Ochsner method is presented in detail.

In conclusion, I should like to express my gratitude and indebtedness to Dr. Frederick A. Coller, F.A.C.S., Director, Department of Surgery at the University of Michigan Hospital, U.S.A., for his valuable advice and for his courtesy in granting me the facilities to make this study.

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THE TREATMENT OF SCIATICA

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THIS article deals only with the treatment of sciatica, and it is assumed the diagnosis has been reached and a search for the cause of the disease, such as tabes or septic foci, has proved, as it often does prove, unsuccessful. All the cases thus treated have been referred on account of their refractory character and refusal to yield to other measures. The advantages claimed by the method described are the rapidity of treatment, the simplicity of the technique, and the higher percentage of cures than has been obtained with other methods. This fact has been emphasized by Evans[1]; immediate and complete relief or cure was achieved in over 60 per cent. of cases, and 13 per cent. derived considerable benefit. Douthwaite[2] states that progress was excellent, and 28 cases out of 32 completely recovered. Lindemulder[3] reported 40 patients cured, and in 6 no benefit was experienced. In 50 per cent. of his cases Brain[4] found that the pain was relieved, and sometimes that the result was dramatic; if necessary a second injection was given after two to three days.

The two principles involved are (1) stretching of the nerve roots by a harmless fluid, and (2) manipulation. Originally the injection was done under a local anæsthetic, and under these conditions full manipulation is not possible. Now, however, the injection is given under evipan and the manipulation can be done simultaneously without the use of any other anæsthetic. If, however, the subject is very muscular a general anæsthetic is probably desirable in order to secure absolute relaxation.

In my practice the technique is as follows: The patient is admitted to hospital or nursing-home on the previous evening and an enema is given. The following morning the treatment is carried out. First everything is prepared—100 c.cm. of sterile normal saline solution containing 1 per cent. novocaine in a warm bowl at 120° F.; two lumbar puncture needles, a 20 or 50 c.cm. syringe, the nozzle of which fits the lumbar puncture needle accurately, a hypodermic syringe of 2 c.cm. capacity for coramine if collapse should occur (this has never yet happened), and a 10 c.cm. syringe for the evipan. The object of the injection is to deposit fluid in the epidural space through the sacral hiatus. I mark the position of this before giving the evipan.

The patient lies on the affected side with thighs flexed as for a lumbar puncture. The buttocks are brought to the edge of the bed and care is taken to see that they are vertical to the bed. The tip of the coccyx is located with the finger and the finger moved up towards the sacrum for a distance of two inches. This point is usually over the sacro-coccygeal foramen, which is bounded above by the concave lower border of the sacrum and at the sides by the two lateral tubercles. The two lateral tubercles are felt for and the foramen is midway between. This is the injection point. The skin over this area is well cleaned with methylated ether, and an iodine dot made over the injection point.

The patient is then given the evipan. As now supplied this is made up in two vials. The 10 c.cm. syringe is filled with the diluting sterile water and emptied twice into the phial containing the evipan. The patient's arm is prepared for an intravenous injection, and the evipan is injected intravenously, the patient being instructed to count slowly. In 3 to 5 seconds the patient will be unconscious. He passes into this phase with great suddenness—a preliminary yawn followed by stertor being the usually observed signs. It is noted how much evipan has been given at this stage (the injection is given slowly), and as much is given again. I have never found it necessary to give more than 7 c.cm.

The patient is replaced in the position for injection; rewashed, the operator again identifies the sacrococcygeal foramen and slowly introduces the needle. The needle first penetrates the skin forwards at an angle of about 60°. It is felt to penetrate the sacrococcygeal ligament. As soon as penetration is felt to be complete the direction is changed and is made almost vertically upwards parallel to the general direction of the canal. The needle then has entered the epidural space. The trocar is withdrawn and the syringe applied. Suction is then made to be certain that the needle is not in the spinal theca—if it were cerebro-spinal fluid would be withdrawn. The syringe is now filled with the saline solution and 50 to 70 c.cm. of fluid slowly injected. No great resistance should be met. The needle is then withdrawn, the puncture dabbed with iodine, and if desired a collodion plug can be applied. When this is accomplished manipulation is started. First the spine is extended by placing the knee in the affected region and with the two hands in front of the body pulling backwards, at the same time pushing forward with the knee. The patient is then placed on his back and both thighs are fully flexed alternately, the opposite thigh being held flat by an assistant. Rotation of the spine and mobilization of the sacro-iliac joint can be secured by fixing one iliac bone and forcibly rotating the opposite side, this being done on both sides. Finally, the muscles are firmly kneaded in the gluteal and lumbo-sacral regions.

The patient stays in bed for the day. As a rule there is very little after-pain, and the pain of the sciatica has completely disappeared on recovery to consciousness. It is advisable to massage the back the next day and apply some radiant heat, and in some cases a course of exercise is advisable. I have records of a number of cases completely relieved by these methods after radiant heat, salicylates and other methods had failed. In addition it is sometimes an advantage, as pointed out by Françon, to inject in the gluteal region, at an interval of five days, two injections of 5 c.cm. of lipiodol. This should be injected warm, otherwise it does not easily flow in the syringe. The syringe needle should also be previously warmed. As far as I know there are not any contra-indications to the treatment, which has produced relief or cure in over 80 per cent. of cases. Three cases have derived no benefit in my series. I have also used the injection, without, of course, any manipulation, in cases of osteo-arthritis of the hip-joint, with great relief of pain in the majority of these cases.

The injection can be repeated at any interval without any bad results. In one refractory case I made two injections in a week, in others the injection has been repeated in 6 to 9 months' time. The relief is so great that on the return of pain some patients have asked for the injection of their own free will and accord. Of course it is not necessary to use evipan—an infiltration anæsthesia with novocaine may be all that is required. However, I favour the former as there are then no subjective sensations. In out-patient practice the patient can return to work two days after the injection. It is desirable, however, to keep him in bed on the day of the injection.

To summarize: the method is easy, successful often in the most resistant cases, free from risk, and is in my experience the best available method for treating refractory cases of sciatica.

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INJURIES TO KNEE JOINTS

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IN treating an injury to a knee it is essential to make an accurate diagnosis of the condition. To ensure this two things must be done: (A) *A detailed account must be taken of the history of the injury,* which should include (*a*) type of injury, (*b*) previous injury, (*c*) history of locking, (*d*) does the joint let the patient down? (B) *A detailed examination must be made.*

The salient points to note are: (1) *Presence of swelling*—is it (*a*) synovial effusion, (*b*) synovial thickening, (*c*) capsular thickening, (*d*) extracapsular thickening? (2) *Presence of muscular wasting,* especially of the vastus internus muscle. Measurement is best taken four inches above the upper limit of the patella on each side. (3) *Areas of tenderness*—(*a*) over internal semilunar cartilage, (*b*) over external semilunar cartilage, (*c*) over attachments of internal lateral ligament, (*d*) over attachments of external laternal ligament, (*e*) over quadriceps expansion on both sides of patella, (*f*) both sides of ligamentum patellæ over infra-patellar pads of fat. (4) *Movements of the joint,* limitation and pain:—*Extension:* In a displaced internal semilunar cartilage extension is limited 5–10° and there is pain on trying to force extension. Also in these cases there is a characteristic spring felt on forcing this movement. But occasionally this limitation of extension is found in strains of the lateral ligaments, in some cases of gross infiltration of the joint from severe sprains and in some cases of hypertrophy of the infra-patellar pads of fat. *Flexion:* In any case of injury to the knee joint in which there is effusion and rest without treatment has been adopted, adhesions form and limit flexion. The degree of limitation is in direct relation to the severity of the injury and to the time that rest without treatment has been allowed. *Rotations :* These must be carried out with the knee half flexed—(1) internal rotation of the tibia on the femur, (2) external rotation of the tibia on the femur. *Lateral mobility :* This is tested with the knee fully extended, which puts strain on—(1) the internal lateral ligament if lateral mobility outwards is tested for, (2) the external lateral ligament if lateral mobility inwards is tested for. *Forward movement of tibia on femur :* This is tested with the knee extended. If very lax it may denote rupture of the anterior cruciate ligament. After injury to the knee joint, in which there has been a large effusion and marked muscular wasting has occurred, there may be general laxity of the joint and this forward movement of the tibia on the femur may be associated with this general laxity of the joint. In manipulating a knee joint this movement must never be forgotten. *Backward movement of tibia on femur :* This is tested with the knee half flexed. If pronounced it may denote rupture of the posterior cruciate ligament. *X-Ray examination* rules out fracture, or tearing away of a flake of the internal femoral condyle, in some cases of sprain to the internal lateral ligament.

Injuries of the knee joint may now be considered in order of frequency. *Simple sprains of the knee joint* are due to a twisting injury, acute flexion or extension injuries with no history of locking. It is essential in these cases to avoid the formation of adhesions and prevent muscular wasting. *Injury to the semilunar cartilages :* There is a twisting injury in which the femur rotates inwards and with the tibia fixed. The cartilage, usually the internal, may become either nipped or pinched, or one of its attachments loosened, or the cartilage split. If nipped or pinched only, there is usually no limitation of extension, but only tenderness over the cartilage. If still displaced there is the characteristic limitation of extension with pain over the cartilage. In cases of external semilunar cartilage, there may be a characteristic swelling over the cartilage denoting a cystic or fatty condition of the cartilage. Also on extending the knee from full flexion there may be half-way through the act a characteristic click, which is painful. *Injury to the internal lateral ligament:* There is a history of a blow on the outer side of the knee so as to force open the space between the internal femoral condyle and the internal tibial condyle. There is pain along the ligament, at either attachment or just above the femoral attachment if a flake of bone becomes detached with it. Full extension may be limited 5–10°. *Injury to the external lateral ligament:* This is less common and is usually due to direct violence, and is often associated with injury to the tendon of biceps. *Injury to anterior cruciate ligament or tibial spine* is due to forcible hyperextension of the knee. It is found that the tibia can be pulled more forward than normal on the femur. *Injury to the posterior cruciate ligament* is commonly due to a sudden forcible flexion injury of the joint. Here the tibia can be displaced backwards excessively.

In these injuries to specialized structures of the joint there is commonly a sprain of the joint as well, and in treating them the sprained joint as well as the damaged special structure, must be considered, otherwise adhesions will form and muscular wasting occur.

The treatment of a simple sprained knee.—We have pointed out that rest alone, with perhaps some soothing lotion or Scott's dressing only promotes the formation of adhesions and muscular wasting. On the other hand, if the joint is treated as follows it will recover in the shortest possible time: (1) *Preliminary rest* allows the muscles to regain their tone. No weight bearing is allowed, but gentle active movement without producing pain or making the joint feel tired is encouraged, to be carried out for a few minutes three times daily. The period of this preliminary rest varies from 1–2 days to a week, according to the degree of the sprain. (2) *Massage* should be gentle at first, then with increasing vigour. (3) *Surging faradism* must be gentle, but picking up each muscle separately. (4) *Diathermy.* (5) *Active movements at the beginning* should be encouraged and this is combined with preliminary rest. It must be carried out as stated previously, i.e. without weight bearing and without producing pain, or the feeling of tiredness. (6) *Passive movements* should be in the form of a gentle manipulation each day. Those movements which are outside the patient's control are carried out first. The patella and the ligamentum patellæ are freely mobilized by lateral pressure on the patella, first on one side and then on the other, with the knee extended; tension is applied and the joint capsule well stretched; then the tibia is pulled well forward on the femur, finally extending, flexing and rotating the joint. These movements should obviously be performed without producing excessive pain, and will be found to increase the range of joint movement appreciably each day. If movement is not improved by these gentle manipulations, and there is still limitation of range, forcible manipulation under an anæsthetic must be carried out without delay. Treatment must be repeated each day, and must last for at least half an hour to be of any use. In slight sprains the joint may have recovered completely in 4–7 days, but recently I have had two cases of severe sprain which required treatment daily for five weeks.

Both had two manipulations under an anæsthetic, as it was realized at the end of a week that the movements were not increasing, because adhesions were beginning to form. The first manipulation made the joint very painful for two days after, but it recovered with a greater range than before, and this range was gradually increased each day for a month. Then it was realized that the last degree of flexion was being held up by adhesions, and a second and final manipulation was carried out.

Injury to the semilunar cartilage.—If a simple nipping of the cartilage has occurred, the joint should be treated as in a simple sprain, except that the period of preliminary rest should be at least a week. Deep kneading massage over the cartilage should be started at once, as this prevents the formation of an enlarged fatty cartilage. If the knee is locked, or there is a definite history of locking, it is probable that the cartilage is split or torn from one of its attachments. If the cartilage is still displaced, as shown by limitation of extension 5–10°, it should immediately be replaced by manipulation. If seen within three hours of the injury, an attempt at reduction may be made without an anæsthetic. If seen later, the patient should be anæsthetized with gas and oxygen, to which ether can be added in order to obtain full relaxation. The knee is slightly flexed and traction is applied, then gradually increase the flexion, and at the same time externally rotate the limb with pressure over the internal semilunar cartilage. Often the cartilage will be felt to reduce with a click. If it does not, then, with the knee fully flexed and firm pressure over the cartilage, suddenly forcibly extend and internally rotate the knee. If reduction has not occurred, now pull the tibia well forward on the femur with the knee well flexed, and exert firm pressure over the cartilage. It is usually easy to make out when reduction has taken place as the knee can be fully extended, and the characteristic spring felt on carrying out this movement is lost.

If reduction is impossible, operation should be carried out as soon as the acute traumatic condition has subsided. Sir Robert Jones always advocated the importance of waiting for the acute synovitis to subside before operation. If there is a definite history of locking, which has either required reduction or has slipped back on its own, what is the next procedure? Every case should be treated on its own merits; if a young athlete is just starting on his career, the cartilage should be removed without delay, as recurrence is almost certain to happen, and this may occur just before an important athletic event. On the other hand, if the athlete is approaching the end of his career, it is worth giving the knee another chance. If it recurs, it should be removed. Sometimes it is difficult to make out whether or not the cartilage is torn, and in these cases another trial should be given.

A footballer sprained his knee by a twisting injury on going to kick a ball. The knee gave way several times during the next four months, but never locked. It was found on examination that the quadriceps of that side were markedly wasted and there was slight limitation of flexion. The condition was most probably a loose cartilage, in spite of no history of locking, but it might have been due to the quadriceps insufficiency and adhesions. In spite of a manipulation and restoration of the quadriceps power the knee gave way again. Operation revealed a loose internal cartilage, but on the history of quadriceps insufficiency the trial of manipulation was justified.

Quadriceps insufficiency may cause the joint to give way continually and also to swell. In these cases every effort must be made to restore the quadriceps power. It should be remembered that intracapsular adhesions are the commonest cause of persistence of wasting, and in some cases in which they are present there may be no limitation of movement. The only symptom given is that there is pain with excessive movements, such as sprinting or twisting at football. Sir Robert Jones insisted on this point and that a knee joint should never be labelled a functional case until the effect of manipulation had been tried. After removal of the cartilage it is most important to restore the full range of movement and muscular wasting.

Sprains of internal lateral ligament.—Sometimes in these cases a flake of bone comes off with the upper attachment. The knee should be firmly bandaged with a pad of felt over the internal lateral ligament; and if walking is to be allowed it is best to put a valgus wedge ¼ inch on the inner side of the shoe to relax strain on the ligament. Contrary to teaching, I massage these cases from the very beginning and treat the joint as well, as in practically all cases the joint is sprained. If treatment is not started at once adhesions form in the joint, and there is muscular wasting and extremely tender areas appear. These occur over the ligament, and both of its attachments, especially lower attachment, around the insertion of the three muscles, sartorius, gracilis, and semitendinosus. *Sprains of external lateral ligaments* are treated on the same lines as the internal lateral ligaments. *Ruptured cruciate ligaments or avulsion of the tibial spine*, if seen at once, should be operated upon, and steps taken to sew down the torn ligament or peg back the tibial spine.

There is a most important clinical condition seen in middle aged people after forty. The history is that the joint swells after exercise. This condition is typical of early osteo-arthritis, and a great deal can be done for these cases if they are recognized as such: (1) Rest with a firm bandage over Scott's dressing; (2) gentle active movements without weight bearing; (3) gentle manipulative movements every day, combined with massage, surging faradism, and diathermy or ionization. If there is gross limitation of movement, the joint should be manipulated with care under an anæsthetic, and this followed by the above treatment. The object in treatment is to correct the muscular wasting often found, and limitation of movement from changes in the capsules. If full range of movement is restored, and the muscle power restored to normal, the joint will recover quickly, and the osteo-arthritic process may be arrested for years. The general practitioner may criticize this by saying that it is impossible for him to obtain electrical treatment for his patient. The reply is that as initial rest is essential, the patient can get to the treatment on crutches. If there is no treatment centre, the patient should be instructed to move the joint, without weight bearing, more and more each day, at the same time massaging it two or three times daily. He should also be given the remedial exercise of contracting the quadriceps for two minutes three times a day.

Conclusion.—To summarize the important points in the treatment of knee injuries: (1) If knee injuries are rested without treatment, adhesions form and muscular wasting occurs. (2) Treatment is started at once, and is carried out daily. It must be realized that this brings the bruise to the surface sooner than normal, and the joint becomes more tender at first, but as this stage passes off, so marked improvement will be noticed. (3) If movement is not progressing, forcibly manipulate under a general anæsthetic, and follow with treatment. Remember that manipulation stirs up the joint again, and makes it worse for two or three days. Two manipulations may be necessary. Never label a knee joint as a functional one, until the effect of manipulation followed by treatment has been tried. (4) In all cases in which there is limitation of movement, full range must be restored by manipulation, followed by treatment. (5) The commonest cause of quadriceps insufficiency is intracapsular adhesions and these must first be dealt with by manipulation. Remember that intracapsular adhesions may be present in a knee joint without limitation of movement, and these can only be broken down by a forced manipulation. (6) If a cartilage be displaced and cannot be reduced by manipulation it should be removed. If an athlete at the commencement of his career locks his cartilage, it should be removed. If he is drawing to the end of his career, the cartilage should be given another chance. In some cases it is difficult to make out whether quadriceps insufficiency or the cartilage is at fault. After correcting this, if the knee gives out again, the cartilage should be removed.

CHRONIC SKIN TROUBLES OF TOXÆMIC ORIGIN

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IN carrying out X-ray investigations for chronic intestinal stasis, I have been struck by the considerable proportion of cases of long-standing toxæmia in which the skin is affected with chronic disease. Stasis is common, far too common, and chronic skin troubles are not rare; hence the occasional co-existence of the two might be a coincidence to be anticipated. If that were so, it would follow that some sufferers from chronic skin disease were otherwise in perfect health. At first sight this might appear to be the case, for some of the victims of obstinate skin disease are strong young men and women, athletes even. And indeed there may be nothing amiss with the build and muscular development, but the experienced eye sees at a glance the stigmata of stasis: the lack of freshness of complexion (noticeable even under a mask of sun-tan); over-deep staining of the skin in regions that are normally pigmented: under the eyes, in the axillæ, at the back of the neck, around the nipples.

A physical examination reveals other signs of stasis: the skin (apart from the disease) is sallow, fatless and inelastic; its surface is rough and papular. There may be brawny induration of the subcutaneous tissues, especially on the dorsal surface of the upper arms in women; this, without doubt, is due to subthyroidism. There are numerous signs of a poor circulation: the skin of the forearms is mottled; the hands and feet are cold, and chilblains may be troublesome. In many sufferers from chronic skin disease there are more advanced manifestations of stasis: pyorrhœa occurs from toxic gums, rheumatic swellings of joints or rheumatoid arthritis in an early or advanced stage, constipation with its attendant digestive derangements, colitis and neuritis.

Chronic skin disease occurs in quite young people, even in children, and in them is always accompanied by very definite manifestations of stasis, constipation and indigestion, general wasting and softening of the toxic muscles and ligaments of the body. The lack of effective muscular support of the joints leads to spinal curvature, flat foot and other deformities. Over-extensibility of the joints is usual in toxic children; the thumbs are "double-jointed," the fingers and wrists can be bent back to an abnormal extent, the elbows can be over-extended. These peculiarities persist throughout life and afford evidence of stasis in childhood. General loss of fat causes the viscera to lose their support and brings about the common condition of Glénard's disease or visceroptosis.

Skin diseases due to toxæmia.—As already mentioned, the skin of "toxic" subjects is inelastic, rough and papular; usually, too, it is pale from lack of exposure to daylight. The commonest of all toxæmic skin troubles is acne—a mere intensification of the "spotty" (papular) skin of toxæmia. Indeed, so common are black-heads and pustules at adolescence that they are apt to be regarded as quite natural; this is a great mistake, for this very common sign of stasis, acne on the face, chest and back, should be hailed as a danger signal, and many an attack of appendicitis (to name only one common consequence of neglected stasis) might be avoided.

Other chronic skin diseases frequently seen in the subjects of stasis are psoriasis and eczema, especially the serpiginous variety that spreads in rings from centres, heals in the middle as it spreads, but ever starts anew. Whatever form the skin disease takes, there is almost certain to be an admixture of acne with it; black-heads or pustules are to be seen on face and neck, on chest and back, on buttock and thigh. Signs of digestive disorder are almost constant: constipation (perhaps alternating with mucous diarrhœa), a furred tongue, a large splashy stomach, a thickened terminal ileum and a thickened iliac colon.

Confirmation of diagnosis.—When a case of chronic skin disease of many years standing is offered for treatment, it is not a matter to be lightly or casually undertaken, since all manner of skin remedies will certainly have been tried already. It is essential, at last, to get to the bottom of the causation; this involves a complete diagnosis, omitting nothing. A methodical search must be made for hidden foci of infection; in this search X-rays are necessary to exclude infection of the nasal and other facial sinuses and of the roots of the teeth. A gall-bladder investigation may be required. The gastro-intestinal tract must be investigated by a bismuth meal and a barium enema; this is certain to yield indispensable information.

Stasis associated with skin disease.—I propose to describe briefly a few cases to illustrate the fact that profound toxæmia exists when there is a chronic skin disease, and then a few further cases to demonstrate the gratifying results of treatment both on the general health and on the skin trouble.

Case 1. *Urticarial erythema.*—A married woman, aged 49, suffered from life-long constipation; had two or three attacks of "appendix"; vomiting in the night for hours at a time. At 34, an operation for uterine fibroids; at 39, an operation for prolapse of the rectum. X-ray investigation showed a capacious rectum; a sharply-bent splenic flexure; a mobile cæcum that curled back in the pelvis ("periwinkle cæcum")[1]; catarrh of the colon ("colitis"); pyloric spasm.

Case 2. *Chronic eczema.*—A young woman, aged 22, suffered as a little girl from anæmia and headaches. From the ages 5 to 10 she had eczema badly on the front of the thighs. From 13 to 18 it recurred though less badly. At 21 it began again on the wrists and backs of the hands; itching was troublesome. While at the seaside, with sea- and sun-bathing, the eczema almost cleared up in two weeks, but recurred on her return to town and to office work. As regards general health, she was liable to catch colds, with ulcers in the mouth; was easily tired; the eyes ached; constipation; flatulence, distension, loss of weight; the knees grated; the skin was infiltrated ("subthyroid"). X-ray investigation revealed fixation of the iliac colon, catarrh of the colon ("colitis") and of the appendix; duodenal distension and pyloric spasm. As the result of a month's holiday by the sea, the general health and the eczema improved, but relapsed when she resumed office work in town. There had been no gain in weight. As no permanent improvement had occurred, an operation was performed two months later. The appendix was found thickened, its base tied back by a band. The iliac colon was bound by firm bands that kinked and twisted it. The left ovary was cystic. The cysts were punctured by the surgeon, the bands divided and the raw surfaces covered in, the appendix was removed. She made a good recovery and improved steadily in health; the eczema improved also but did not disappear; occasional attacks of indigestion still occurred. About 3 years later she married. During the subsequent pregnancy her health improved notably and the eczema cleared up, but returned slightly 2 months after the birth of the child. This improvement during pregnancy is well-known and is due, *inter alia*, to increased activity of the thyroid and consequent improved circulation.

Case 3. *Acne.*—A girl, aged 15, had had constipation since infancy. She now suffered from lack of energy, "toxic" skin and lax ligaments. X-ray investigation disclosed a long, tortuous pelvic colon, distension of cæcum and appendix, catarrh of the colon and of the terminal ileum, incompetence of the ileo-cæcal valve. No improvement followed treatment, so the abdomen was opened and adhesions between the pelvic colon and the left ovary were divided and the appendix was removed. Unfortunately she died of pneumonia due to her toxic state.

Case 4. *Urticaria.*—An unmarried woman, aged 38, suffered from constipation, pain, flatulence and water-brash. She had had "nettle rash" at the age of 32 and again at 36, lasting two or three months each time. Her appendix was removed at the age of 35 after an attack of pain. X-rays showed a very long, tortuous colon from hepatic flexure to rectum, a mobile distended cæcum, colitis, ileal stasis, duodenal distension, pyloric spasm.

Case 5. *Eczema.*—A married woman, aged 50, had had lifelong constipation and "seediness." She complained now of indigestion, discomfort, pain in the epigastrium and through the chest, with arthritis of all joints, the knees worst. Her appendix was removed at the age of 39; it had ulcerated into the Fallopian tube. Septic tonsils were removed at the age of 48. She had eczema chiefly on the back and behind the ears. X-rays showed great elongation of the pelvic colon, colitis, adhesions of the ileum in the right side of the pelvis.

Case 6. *Giant urticaria.*—A married woman, aged 59, had had constipation since the age of 18; flatulence; many brown sebaceous patches on the skin. Urticarial patches came out, anywhere, now and then; enemata improved the urticaria. X-rays showed ptosis of colon and stomach; the cæcum deep in the pelvis, possibly adherent there, and causing ileal torsion and ileal stasis; duodenal distension, pyloric spasm and abnormal retention of the gastric contents.

Case 7. *Blotchy eruption, eczematous.*—A married woman, aged 50, had typhoid, complicated by acute pneumonia, at the age of 15. She had had constipation ever since, nausea or vomiting, flatulence (downward) and distension; epigastric pain was relieved by vomiting food or bitter froth. At the age of 34 the appendix was removed after several months of severe pain on the *left* side; the appendix was found kinked and it contained fluid. The operation brought no relief from pain, vomiting or constipation. Since the age of 42, rheumatoid arthritis and a blotchy eczematous eruption all over, worse on the arms and the backs of the hands. At the age of 47 septic tonsils were removed. X-ray investigation revealed a greatly elongated pelvic colon, elongation and tortuosity of the descending and iliac colon, severe colitis, a mobile cæcum tethered at the site of the appendix, incompetence of the ileo-cæcal valve, pyloric spasm.

Case 8. *Eczema.*—A medical man, aged 46, who practised dentistry in the tropics, complained of eczema which began one year before (at the age of 45) on the hands and then all over the body. His health was good, but he was " run down " by work in the tropics. He had had constipation for two years (since the age of 44). Previous history: At the age of 33, pericarditis, endocarditis, pneumonia; at the age of 34, enteric fever severely; at the age of 42, had an appendix operation after pain of several years' standing. The appendix was thick-walled, hard and fibrous; no adhesions. The urine was found full of *B. coli* and streptococci. X-rays showed a long tortuous pelvic colon, fixation of the iliac colon, a sharply-bent splenic flexure, incompetence of the ileo-cæcal valve, dilatation of the duodenum.

Case 9. *Psoriasis.*—A man, aged 49, had had psoriasis since the age of 17. Indigestion began at 40; also stoutening. X-rays showed elongation of pelvic colon, undue mobility of cæcum, catarrh of colon and appendix, pyloric spasm. The appendix was removed shortly afterwards; it was found tied to the cæcum and was thickened; the patient made a good recovery, but there was no benefit to his health or to the psoriasis.

Case 10. *Acne.*—A man, aged 34, was formerly a cross-country runner. He was inclined to indigestion, bad dreams and furred tongue. X-rays revealed an elongated pelvic colon, a sharply-bent splenic flexure, a tethered appendix, catarrh of the colon, an incompetent ileo-cæcal valve, spasm at the ileo-cæcal entrance and at the pylorus. Dental films showed infection of several of the roots. X-ray exposures (small filtered doses) and ultra-violet light, in conjunction with " stasis " treatment, improved the acne notably.

Case 11. *Acne rosacea.*—A married woman, aged 55, had had constipation since childhood. All teeth were removed (for " pyorrhœa ") at 51; glands were removed from the neck at the age of 53; others from the groin at 54; they were said to be neither malignant nor tuberculous, but " toxic." Loss of weight (from 12 st. 3 lbs. to 10 st. 9 lbs.), giddiness, nausea, failing appetite, bad taste, muscular weakness, failing sight. (Blood and urine normal; blood-pressure not raised.) X-rays showed dilatation of the rectum, enormous elongation of the pelvic colon, ptosis of the cæcum, catarrh of the colon. Three weeks later an operation was performed. The abdominal wall was found to be lax and fatty; the cæcum, ascending and transverse colon were very big; the appendix was long and apparently normal; the second half of the transverse colon was hypertrophied up to the splenic flexure, which was bound high up by bands; the bowel at the flexure was narrowed; so was the descending colon; its lower part tapered down to the iliac colon, which was free. The pelvic colon was very long and was free. Colectomy was performed since no lesser measure seemed to have a chance of improving her health; an end-to-end union was made. No later notes are available.

Analysis of findings.—An analysis of the X-ray findings in these eleven cases shows pronounced abnormalities in all. The most frequent is catarrh of the colon ("colitis"); this is evident in all but one; it is one of the most universal changes produced in man by his "civilized" diet. Next in frequency in the series is elongation of the pelvic colon; this is considerable in eight of the eleven cases, extreme in four of them, and almost fantastic in one (*Case* 11). Third and fourth in order of frequency are preternatural mobility of the cæcum and spasm at the pylorus; each of these occurs in seven of the eleven cases; incompetence of the ileo-cæcal valve occurs in four of the eleven. In each of the above cases, then, there is more or less severe stasis giving rise to profound toxæmia which affects the skin in common with every other tissue and organ.

The practical aspect.—I come now to the other—the practical—side of the matter: the result of thorough and systematic treatment of the toxæmia so as to restore the tissues (including the skin) to a wholesome state. When this is done, it will be seen that the skin trouble clears up, either spontaneously or readily under the influence of simple local treatment, and having cleared up, it does not recur so long as the tissues are kept healthy by vigilant attention to diet and regime. The three cases described below (with X-ray illustration) were under the care of Dr. A. Graham Stewart.

Case 12. *Eczema.*—A married woman, aged 65, had eczema 16 years before; it cleared up. She had it again severely six months before; it spread, and at the time of my X-ray investigation it covered the arms and neck. The general health was poor; digestion faulty; there was " head-wagging "—a not infrequent manifestation of toxæmia. X-rays showed extreme elongation of the pelvic colon (Fig. 1), pronounced catarrh of the entire colon, shown (as usual) by exaggerated sacculation and persistent spasmodic narrowing (Fig. 2); drooping of the cæcum and transverse colon (Fig. 3); the cæcum habitually in the pelvis; pyloric spasm; enlargement of the stomach and undue retention of its contents. With diet, regime, mechanical and medical treatment, the skin trouble cleared up and by the end of four months the patient was strong and well and able to walk miles daily without fatigue.

Case 13. *Psoriasis.*—A married woman, aged 46, had had psoriasis on the back, arms and legs since the age of 25. Constipation since 41; rheumatic stiffness began in wrists and hands at 42 and increased and extended; she was liable to lumbago. She had gained weight in the past two years. She visited many watering places for the rheumatism and the skin trouble, but without lasting benefit. X-rays revealed elongation of the pelvic colon (Figs. 4 and 6) and sharp looping in the left side of the pelvis; firm fixation of the iliac colon (Fig. 5); a high, sharply bent splenic flexure; distension of the cæcum (Fig. 7); prolonged stasis throughout the large intestine; considerable catarrh of the colon (" colitis "); hypertrophy of the end of the ileum (Fig. 8); some enlargement of the stomach. With thorough treatment, the general health improved very greatly; then the rheumatism began to yield, slowly at first, then rapidly. While these improvements were going on, the psoriasis was clearing up and had been forgotten by the time she could be discharged cured of the rheumatic trouble.

Case 14. *Psoriasis.*—A married woman, aged 59, had been delicate from birth (a " bottle baby "); the bowels had always been " excitable "; at the age of six to seven she passed much mucus. She was high-spirited, but easily exhausted; at 17 (while at a school in Belgium) she was ill and liable to faint; the menses were absent for several months. At 21, psoriasis began all over the body, and persisted till she came under treatment at 59. Only once had she been free from it—during her one and only pregnancy at the age of 34 (she married at 31). (Compare Case 2 of first series.) At the age of 29, after years of pain in the right iliac region, the appendix was removed; it was found to be normal, but ovarian trouble was found, but was not dealt with because the surgeon had not obtained the previous consent of the patient. Indigestion, flatulence and distension persisted, and she had a poor circulation. At the age of 46, the abdomen was explored by a surgeon, who found " appalling adhesions," which he freed. There was no improvement in the general condition. Rheumatism (of many years' standing) continued with liability to stiff neck and neuritis of the arms. She had suffered from constipation since the age of 57; colonic lavage gave very offensive results, with much gas. Loss of weight in the past two years from 8 st. 13 lbs. to 7 st. 12 lbs. X-rays showed ptosis of stomach, transverse colon and splenic flexure (Fig. 9); fixation of iliac colon setting up spasmodic constriction with distension above (Fig. 10); incompetence of ileo-cæcal valve; spasm of end of ileum; dilatation of first part of duodenum; pyloric spasm; enlargement

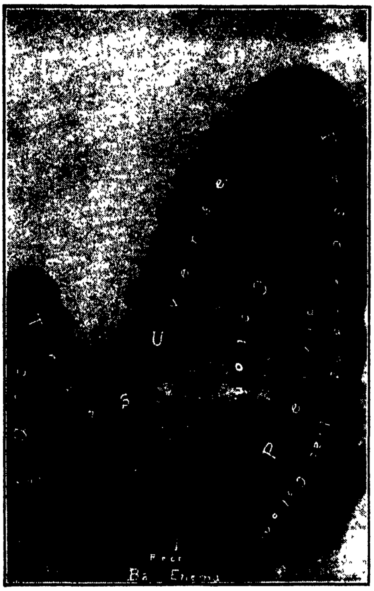

FIG. 1.—Barium enema, in case 12, shows extreme elongation of pelvic colon.

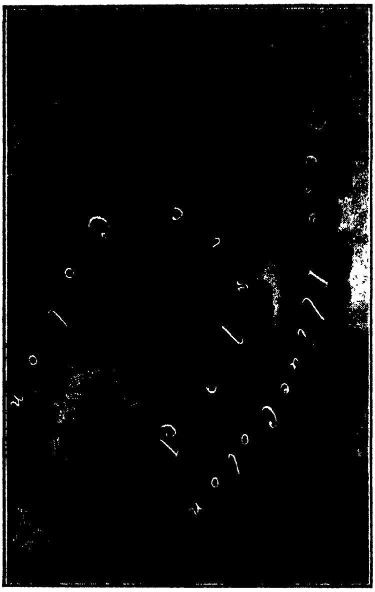

FIG. 2.—Taken on the couch 23 hours after bismuth in the same patient as Fig. 1, shows exaggerated sacculation and spasmodic narrowing from catarrh of the colon.

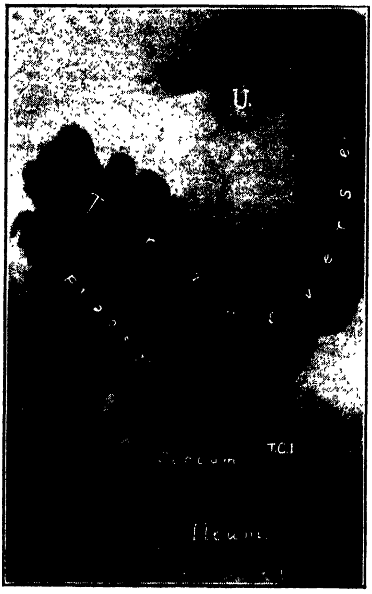

FIG. 3.—Taken on the couch 5½ hours after bismuth in the same patient, shows dropping of the cæcum and transverse colon. T.C.I. = terminal coil of the ileum.

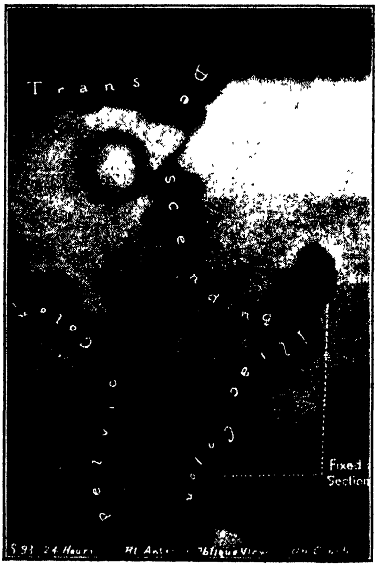

FIG. 4.—Case 13. Taken on the couch in the right anterior oblique position 24 hours after bismuth; shows a portion of the elongated pelvic colon, the firmly tethered iliac colon; spasmodic narrowing from catarrh of the bowel-wall.

of stomach, succussion and prolonged retention of gastric contents. So extreme was the obstructive effect of the firmly tethered iliac colon that its operative freeing was deemed essential as a prelude to treatment; this was successfully accomplished as well as the removal of the right ovary, which was fibrous and of the uterus, which was fibro-myomatous. As the result of treatment, the skin trouble cleared up absolutely and permanently in less than nine months after having persisted 38 years.

TREATMENT

Details of treatment vary from case to case, but the general principles may be stated definitely as follows. Mechanical obstruction in any part of the gastro-intestinal tract calls for surgical rectification, especially in young subjects. Dropping of viscera, if considerable, may require an abdominal support (such as the "Curtis"), as well as special exercises to strengthen the abdominal muscles, especially the transverse and oblique (external and internal) muscles which are sadly neglected by almost all people leading a "civilized" life. Hornibrook's exercises[2] are admirably suited to the purpose; most systems of exercises do little or nothing to strengthen these oblique muscles; they concentrate on the rectus abdominis muscles which are reasonably strong to begin with in most people. No abdominal support can keep the colon in its normal place so long as it is filled with heavy fæces; therefore constipation (or rather stasis in the large intestine) must be rectified by diet, regime and medicinal treatment.

As regards diet, the important point is to avoid all foods that putrefy in a toxic bowel. Raw salads and raw ripe fruits and nuts should form an essential part of every meal; farm, dairy and garden produce should make up most of the balance. Foods to avoid specially are those liable to decompose in a stagnant bowel, such as meat, and excess of sugar and starch; carbohydrates in excess allow streptococci to proliferate and produce virulent toxins.

Equally important is the medicinal treatment. This

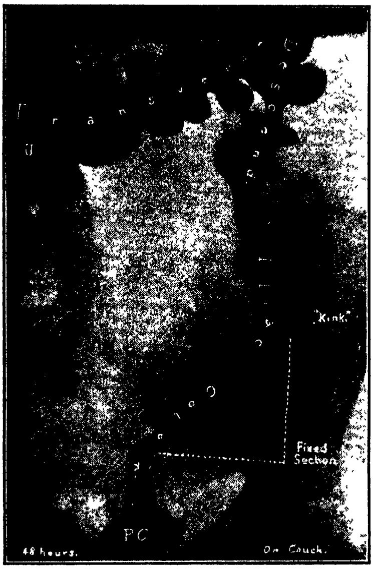

FIG. 5.—Taken on the couch 48 hours after bismuth; same patient as Fig. 4; shows fixation, sharp angulation and spasmodic constriction of the catarrhal iliac colon.

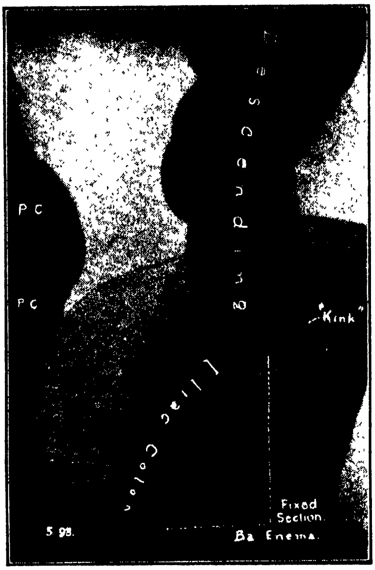

FIG. 6.—Barium enema in the same patient. Shows a portion of the elongated pelvic colon, the constricted fixed section of the iliac colon and great distension of the descending colon ending abruptly at the top of the fixed section. P.C. = pelvic colon.

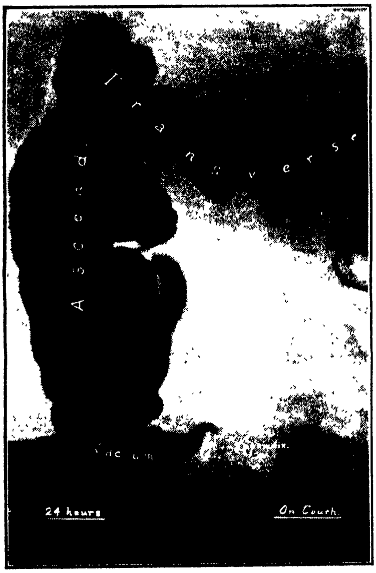

FIG. 7.—Taken on the couch in the same patient 24 hours after bismuth shows distension of cæcum, ascending colon and base of appendix from habitual over-filling.

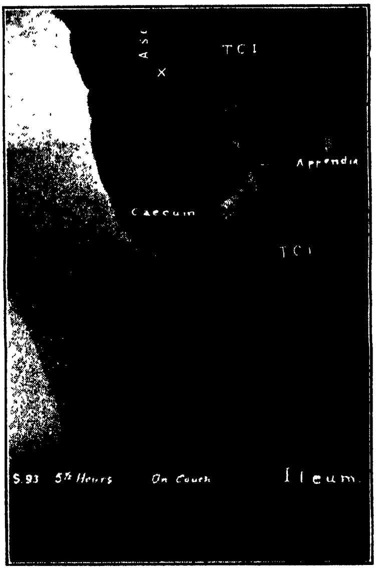

FIG. 8.—Taken on couch in same patient, 5½ hours after bismuth, shows—in addition to the distended cæcum and appendix—the distended and actively contracting terminal ileal coil (T.C.I.), struggling to overcome persistent spasm at the ileo-cæcal entrance (X).

consists of (*a*) belladonna in sufficient doses to limit spasm due to the catarrhal state of the bowel; (*b*) colloidal kaolin (finely divided silicate of alumina) to "adsorb" toxins in the alimentary passages and thus prevent them from entering the general circulation; (*c*) liquid paraffin to render the fæces soft and pliant. Colloidal kaolin and paraffin together form in the bowel a soft pliable fæcal mass that passes readily through the colon. The use of colloidal kaolin for the treatment of stasis with toxæmia was first described by myself[3]; it is, in my opinion, the most valuable recent addition to the practitioner's armoury. It is not a "drug" in the true sense, since its action is entirely physical; no part of it enters the tissues, all is evacuated (unchanged chemically) with the fæces of which it forms a part. The same is true of liquid paraffin. One of the objects of treatment by paraffin and colloidal kaolin is to render the colonic contents specifically light so that the colon does not tend to fall through the mass of ileal coils with their watery contents. No abdominal support can raise a sagging colon if its contents are specifically heavier than its surroundings. Colonic lavage will be needed in cases of life-long constipation until such time as the diet and exercises have overcome it.

Regime includes such measures as open-air exercise; exposure of the skin to regulated quantities of sun-light or (failing it) ultra-violet lamp-light. Usually this is the only skin treatment needed, once the toxins have been eliminated and the skin (and other tissues) enabled to receive a full supply of pure arterial blood. Owing to the poor circulation that goes with "stasis," not only is the quality of the blood that circulates through the skin (and elsewhere) polluted, but its quantity is diminished. The nutrition of the skin is thus seriously impaired in stasis with toxæmia, and it is no wonder if the skin suffers from chronic disorders that fail to clear up permanently till the

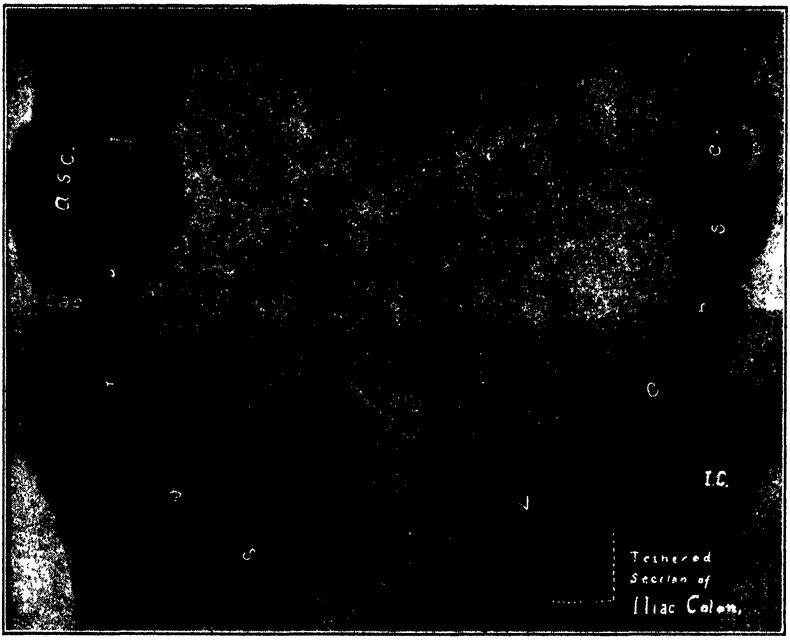

FIG. 9.—Case 14. Taken on the couch 23 hours after bismuth; shows ptosis of transverse colon; deep sacculation of all parts of the colon; tight spasmodic constriction of some portions, especially the tethered lower portion of the iliac colon (I.C.).

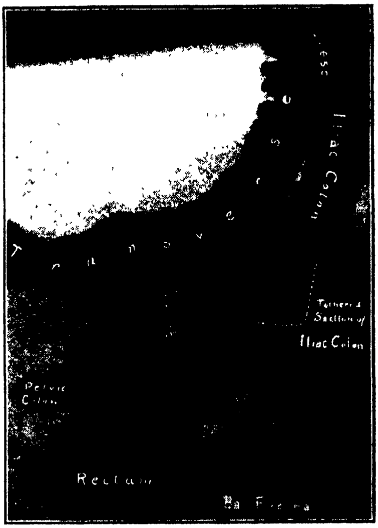

FIG. 10.—Barium enema; same patient as Fig. 9, shows distension of the portions of bowel immediately above the spasmodically constricted, tethered lower section of the iliac colon.

toxæmia has been mastered.

The importance of suitable clothing becomes manifest; the sun- and air-starved skin of over-clothed man presents a striking contrast to the bronzed, sleek, smooth and flexible skin of the man who allows sun and air to play upon his unclothed body[4].

SUMMARY

The best way to combat chronic skin disease may be summarized thus:—(1) Live a healthy life; take open-air exercise; leave off all unnecessary clothing and allow as much of the skin as possible to receive sunlight and air. Men's modern clothes compare very unfavourably with women's in this respect. (2) Adopt a healthy diet, avoiding all foods that putrefy in the intestine, and making natural foods (uncooked foods) an essential part of every meal; not merely an occasional "extra." Soured milk (Yogourt), taken daily, is a great help in many cases because it maintains an acid fæcal reaction and prevents the undue multiplication of putrefactive bacteria in the intestines. Coarse oatmeal and lactic oats help in this direction. (3) Apply the mechanical and "clinic" methods of treatment prescribed after collating the results of a complete investigation of the case. (4) Take colloidal kaolin and liquid paraffin in amounts and in forms appropriate to the case; belladonna at first and from time to time during the course of treatment; other medicinal preparations if indicated by special symptoms.

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OTOSCLEROSIS:

ITS ETIOLOGY AND TREATMENT

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NEARLY thirty years ago, in 1904, Denker, of Erlangen, published his classic monograph, *Die Otosclerose,* in which was described that special type of chronic progressive deafness which has long been a problem to otologists. Following von Tröltsch, in 1859, he called it *Otosclerosis*, a name obviously derived from "sclerosis." As a descriptive title the name was unfortunate and, as might have been expected, its loose application under the misapprehension that the disease was inflammatory in origin has led to confusion with the chronic deafness following post-suppurative and post-catarrhal changes in the middle-ear, conditions from which von Tröltsch expressly differentiated the process he described. Names, however, have a trick of survival and "Otosclerosis" will probably endure despite the inventive ingenuity of later writers. The earliest reliable account of otosclerosis is that of von Tröltsch, but he acknowledged that his exposition of its characters was incomplete; he prophesied, however, that later knowledge would establish its independent position among aural diseases. It was in the light of such later knowledge that Denker wrote in 1904, so that his monograph must hold distinction as the classical description, and it is to cases answering to that description alone that this article is devoted.

The classical otosclerosis begins in young adults, sometimes even earlier. In the hundred consecutive cases upon which this article is based, 81 began between the ages of 10 and 30. Frequently it shows a definite hereditary tendency—55 per cent. in my cases—and it is much more common among women, the proportion of males to females in my cases being 20 to 30. Both the age incidence and the hereditary factor show a special significance in the theory of causation which I hope to establish. Finally, otosclerosis is characterized by peculiar changes in the labyrinthine capsule and the neighbourhood of the stapedio-vestibular articulation. Since I shall confine myself as far as possible to etiology and treatment, I shall merely point out that these changes comprise a bony ankylosis of the stapes (first described as far back as the eighteenth century by Valsalva, Morgagni and Meckel), together with osteophytic outgrowths in the pelvis ovalis and lower parts of the scalæ tympani and vestibuli, with isolated areas of osteoporosis in the bony labyrinthine wall and in the regions of the cochlea and semi-circular canals. A more detailed description of these changes will be given in a monograph which will be published in the near future. It will suffice to say that they resemble those of rheumatoid arthritis and certain other bone conditions and are best explained as being in the nature of trophic changes due to alterations in nutrition.

The published papers upon otosclerosis during the decades following Denker's classic are legion, but no outstanding advances have been made as to the true cause of otosclerosis, and, therefore, its treatment has remained more or less at a standstill. The most significant contributions have been those dealing with its relation to other bone diseases (Fraser, Bronson, Cleminson, Jenkins, Kauffman, Creekmur, Schultz, Beck, Döderlein, Guthrie, Leiri), to disorders of nutrition (Heiman, Sohier Bryant, Ferreri, Brühl, O'Malley), and to endocrine disorders (Delie, Mirvish, Blöhmke, Schöndube, Jousseaume, Stein, Sundrail, Lassalle, Bonpunt). Added to these are two suggestive papers by Escat and Cornet, who discussed the relation of otosclerosis to chronic intestinal toxæmia. To this last hypothesis I shall return again. Apart from these publications, the majority of clinicians and pathologists have shown an unhappy tendency to concentrate entirely upon the ear itself without looking farther afield, thereby confining themselves to the contemplation of the end, to the neglect of the true means whereby that end has been attained. So far as I am aware, no attempts have been made (and I have searched carefully and long for any record thereof) to seek pathological changes in the cerebral cortex of the temporo-sphenoidal lobe or in the auditory and adjacent nuclei in the bulb, although both Gray and I have independently commented upon this important omission. Gray, in 1917, stated that not the temporal bones alone, but the brain also should be investigated. I made the same appeal for wider research in a paper written for the International Congress at Copenhagen in 1928. In that paper, which was overwhelmed in a plethora of contributions and taken as read without comment or discussion, I remarked that although a number of clinical facts pointed very strongly to the true nature of otosclerosis, they as yet lacked the decisive confirmation which can come only from pathological investigation of the brain; hence for the time being my contention could be considered as an hypothesis only, albeit one founded upon significant clinical observations. I may add that this problem of causation has occupied my attention for some years, but hitherto the necessary material for this pathological confirmation has been, and still is, lacking. Otosclerosis is not a fatal disease *per se;* either otosclerotics do not die young, even in this age of reckless motoring, or, when they do, their brains do not fall into the right hands.

Before reviewing the clinical facts alluded to in the last paragraph, earlier references must be given to the relation between otosclerosis and chronic intestinal toxæmia. In 1910, Ferreri suggested the alimentary tract as a possible source of toxins which could act as a determining factor in the deafness, and in the same year I stated definitely, in a paper published in the United States, that otosclerosis is a local manifestation of what is probably a general condition which was of the nature of a chronic toxæmia, in many cases of intestinal origin. I said also that the elucidation of otosclerosis required the cooperative investigation of the otologist, the physician, and the organic chemist. When I wrote this, I had recently come under the influence of Cornet, whose paper will be outlined later. In 1912, Brühl published an interesting case which was strongly suggestive of chronic intestinal toxæmia. In 1916, Sohier Bryant stated a belief that gastro-intestinal toxæmia is a " frequent cause " of otosclerosis, and coupled my name with that of Ferreri as supporting him. In the following year Gray published three cases " in which toxin absorption from the alimentary canal was associated with otosclerosis," but did not appear fully to grasp their significance. Already, in 1904, Escat had pointed out the extreme frequency of primary otosclerosis in all the subjects in whom the digestive canal or its adnexa contains numerous foci of autointoxication, and this appears to have stimulated Cornet to write his paper on " Otosclerosis and Autointoxication " in 1909, translated by me in 1910. From an examination of ten otosclerotics, in all of whom he found signs of intestinal toxæmia, he points to the latter as in accordance with the insidious nature of otosclerosis, its heredity, its first appearance during pregnancy, and the facts of its pathological anatomy.

Space forbids any detailed account here of the action of chronic intestinal toxæmia upon the organism, and the reader is referred to special works upon the subject. It causes disease because the growth of putrefactive organisms gives rise to proteolysis of the proteins introduced into the intestines as food. These products of protein putrefaction are chemical substances which alter the normal chemico-physical properties of the blood plasma, and, their action being slow, it extends over a long period of time. According to one author, there is a marked similarity between the blood changes in intestinal toxæmia, pathological pregnancy, and syphilis, and it is significant that both pregnancy and syphilis have been stressed as causes of otosclerosis, although syphilis is now discarded as a factor. Without entering into further detail, it is of importance to my special subject that these blood changes affect particularly the peri-capillary lymphatics, capillaries, or arterioles in the brain, kidneys, or liver. This emphasizes the call for an examination of the brain in otosclerotics. It may be added that, according to some observers, in migraine it is the pericapillary lymphatics of the optic thalamus which are affected.

Since in intestinal toxæmics chronic catarrh, hay fever, nasal, tonsillar, and dental sepsis are common, the secondary action of the toxins upon the ear may extend beyond the inception of otosclerosis and the latter may be affiliated to certain other cases of chronic deafness commencing at or about middle-age, and progressing, undeterred by traditional local treatments, to serious loss of hearing in a few years. I am, further, inclined to believe that intestinal toxæmia plays an important part in inducing presbyacusis, and an investigation of a large series of temporal bones of persons who suffered with age deafness, and of their cortical centres as well, might possibly give illuminating information.

Taking now my hundred otosclerotics, I found that habitual constipation was volunteered or admitted in 74, and, inclusive of these, intestinal toxæmia was present in 83. Acne, in varying degrees, was present in a fair number, as was seborrhœa. One case had psoriasis which did not yield to treatment until after colon lavage, vaccines, and dieting. Anæmia was present in 12. The appendix had been removed in 12, and colitis had been treated in 10. Diabetes was present in one case, and dyspepsia was a prominent symptom in 38. Exophthalmic goitre with rheumatism occurred in one. Jaundice had occurred twice in one. Migraine was a symptom of varying intensity in 15. Pyorrhœa was present, or had occasioned the removal of all the teeth, in 20. Piles were present, or had been operated upon, in 11. Rheumatism was complained of in 33.

That chronic intestinal toxæmia may be hereditary is well known, and my cases showed some interesting points in this respect. Of 55 who gave definite family histories of deafness, no less than 38 showed one of habitual constipation also, while a similar history was elicited in 14 cases having no familial taint of deafness. Ten of my cases were met with in a quarter of a century of London County Council work; these varied in age from 7 to 15, and all of them, *with their mothers*, were intestinal toxæmics. Similarly, during the examinations I made during the past ten years, 50 per cent. of the sporadic congenital deaf-mutes, again *with their mothers*, gave definite evidence of intestinal toxæmia. There is thus a distinct possibility that otosclerosis, toxæmic deafness, and sporadic deaf-birth may be definitely related. The amount of alimentary toxæmia that is disregarded, even unsuspected, is astonishing, and I can never forget, among my private patients, a family of three sisters, two of whom were otosclerotics while the third suffered from necrosing ethmoiditis with polypi. Not only were these sisters marked intestinal toxæmics, but they reported that their father, mother and brother suffered from habitual constipation, with flatulent dyspepsia and rheumatism.

I may now sum up the clinical and pathological facts which definitely point to the true etiology of otosclerosis. They suggest its commencement rather in the brain than in the middle-ear and labyrinth, and it may be legitimately advanced that they offer presumptive evidence for my hypothesis that the primary characteristic changes of otosclerosis are to be found rather in the organ *by* which we hear, i.e. the cortex of the temporo-sphenoidal lobe, than in the organ *with* which we hear, i.e. the ear, and that the changes in the latter are secondary. These facts may be summarized as follows :—

(1) The insidious and progressive nature of otosclerosis and its tendency to stationary intervals suggest not so much progressive changes in the ear itself as some basic general condition, such as a slow poisoning of the cortical cells and other brain centres of the auditory apparatus, progress being due to increased toxic activities and stationary intervals to increased resistance or to a lessened supply of toxins.

(2) Its frequent connection with pregnancy as an assigned cause or as increasing the activity of the disease is equally suggestive. In my cases, of 80 women 34 were married, and of the latter 17 (50 per cent.) gave pregnancy as the initial cause of their deafness. Pregnancy throws additional strain on the resistance, especially upon the digestive and eliminating organs, and is often associated with endocrine disturbances. In many cases, chronic intestinal toxæmia is present.

(3) The age at which otosclerosis appears is usually that at which chronic intestinal toxæmia begins to manifest its effects, while the apparent preference of this form of deafness for women may, apart from the pregnancy factor, be due to the greater frequence of habitual constipation in the female sex. Women, too, are more prone to endocrine defects than men, and these defects are in definite relation with chronic

intestinal toxæmia. I have found that endocrine cases respond much more readily to treatment if any intestinal toxæmia present is first actively tackled.

(4) The tendency of otosclerosis to be hereditary parallels the hereditary nature of chronic intestinal toxæmia.

(5) The tinnitus, often one of the most distressing and intractable symptoms of otosclerosis, is usually of the continuous, high-pitched hissing type, and frequently precedes the deafness or is an early symptom. It occurs in a high percentage of cases (present in 86 per cent. of my cases, being slight in 5 only, and a first or early symptom in 44 per cent.). These facts point to a central irritation, and it is significant that the tinnitus may be satisfactorily relieved or reduced by active treatment of the toxæmia, especially if the cases are " caught early."

(6) The occurrence, in some cases of otosclerosis, of migraine, which is a not infrequent accompaniment of intestinal toxæmia. That some observers have stated migraine to be due to implication of the pericapillary lymphatics in the optic thalamus suggests the action upon the central nervous apparatus of the organ of hearing in tinnitus and deafness. I may add here that, after treatment by diet, colon lavage, and vaccines, the migraine from which, together with attacks of acute sciatica, I suffered for many years completely disappeared and has never returned.

(7) The nature of the changes in the labyrinthine capsule and in the region of the stapes suggests a trophic origin, as do also the mental dryness and impaired sensation of the tympanic membrane, possibly also any undue patency of the Eustachian tubes.

(8) Lastly, the details given above of my cases as showing the frequency of intestinal toxæmia among them furnish a fact of culminating importance and forms the foundation of this paper. The importance

of the relation cannot, indeed, be over-estimated. The hypothesis fits in with so many of the ascertained facts of otosclerosis that we cannot afford to treat it lightly or disregard it, for it helps to explain so much. It appears to me that the true basis of otosclerosis is a mixed one of endocrine disturbance and toxæmia, both of which are in all probability intimately connected, the toxæmia being the most important.

CONCLUSIONS

To sum up, the primary change in the brain is probably the true starting point of otosclerosis, and this points to the direction which future pathological research should take. The blood changes due to the action of the chemical poisons manufactured in the intestines would produce similar results in the cortex of the temporo-sphenoidal lobe and in the gray matter of the bulb as those in the optic thalami in migraine and in the various forms of amaurotic idiocy due to degeneration of the cortical cells in the occipital lobes. Such changes implicating the peri-capillary lymphatics in the temporo-sphenoidal lobes would result in the degeneration of the cortical cells of the hearing centres. It is, therefore, in an examination of these regions of the brain that, I submit, the elucidation of the long-discussed problem of otosclerosis will be found. It has been plausibly suggested that the reason why the cerebral cortex is the part of the central nervous system selected for attack may lie in its comparatively recent evolution.

The hypothesis of the intestinal origin of otosclerosis has a very practical and important bearing upon treatment. Like many other diseases of problematic origin, treatment has been largely empirical, varied by occasional outbursts of periodic surgical ingenuity. In the domain of internal medication, iodide of potassium, iodine, antipyrin, salicylic acid, phosphorus, cimicifuga, thyroid, parathyroid, adrenaline, thiosinamine, and other remedies have all had their advocates. Locally, pilocarpine injections into the tympanum *via* the Eustachian tube, and oto-massage, either pneumatic or by means of Lucoe's spring probe, have been practised, while such extreme and heroic measures as the radical mastoid operation, trephining of the bony labyrinthine wall, and stapedectomy have been performed.

The method which I have followed during the past few years, and of which I can give here an outline only, has been a combination of intestinal treatment with oto-massage by the electrophonoïde method of Zünd-Burguet. Both require to be carried out concurrently and with perseverance. The treatment of the intestinal toxæmia must be thorough, the mere routine administration of laxatives or purgatives being practically useless. The condition must be attacked consistently by every means at our disposal, foremost being diet, vaccines, and especially efficient colon lavage. Many intestinal toxæmics have "pockets" in which old fæcal matter, undigested food and stale mucus are held up and, unless these are completely cleared, it is unreasonable to expect improvement. To see what such colons contain is to recall the labour of Hercules in the Augean stable, and to wonder that the patients have any shred of health left. Some of my cases, after the first course, which averages eight lavages over a period of between two and three weeks, find it wise to undergo a monthly lavage to keep themselves clean and fit. Diet needs careful supervision and butcher's meat (and often coffee) should be excluded. It need hardly be added that any other source of septic toxins should be treated at the same time and suitable treatment provided if any endocrine disorder is detected.

Oto-massage has always been an established local treatment in otosclerosis, but until the electrophonoïde method of Zünd-Burguet was introduced its results were far from satisfactory. The reason was that the instruments used—the Delstanche raréfacteur and the hand or electric masseurs—were far too coarse in their vibrations and their prolonged use was bound to be harmful in the long run. It is surely irrational to expect good results by employing a masseur the stroke of which is an inch or a fraction of an inch when the ossicular movements are to be calculated in thousandths of a millimetre. To do so is to use a bludgeon to brush away a fly, blue-tailed or otherwise. The massage afforded by the electrophonoïde method is by sound; this sound has all the qualities of the human voice, and is the normal physiological, and, therefore, the ideal stimulus for the organ of hearing. It acts by promoting an active hyperæmia of the whole organ, thereby improving its nutrition.

Results by this combined method of local and general treatment has been, in my hands, satisfactory, in some cases remarkably so. In 27 patients, there were two absolute failures as regards the deafness, both cases of long standing, but the general health was greatly improved. In two others, improvement, save in health, was slight. Thirteen showed moderate but useful improvement, but, for various reasons (four went abroad) did not persevere. Very marked improvement occurred in eight patients (one of whom has since gone to live abroad), all of whom persevered for periods ranging from one to three years. Three cases are now in an early stage of treatment, but are already showing improvement. The best results have been in early cases who have realized the necessity for perseverance, and the earlier the patient is treated the better is the prognosis.

RECENT ADVANCES IN THERAPEUTICS

PER-URETHRAL TREATMENT OF THE ENLARGED PROSTATE

John Everidge (*Proc. Roy. Soc. Med.*, September, 1933, xxvi, 1461) states that per-urethral methods of treating the enlarged prostate have remained in the background in this country, partly on account of the popularity of the valuable operation of suprapubic prostatectomy. The early disasters in this operation must be remembered—through faulty technique and imperfect knowledge of the anatomy and pathology of the enlarged prostate—which followed attempts to remove intravesical projections while the extravesical enlargement was allowed to remain and to cause an even greater obstruction than existed before. Per-urethral technique being, until recently, concerned with intravesical projections alone, must, therefore, risk a retrogression to the methods of those days before the anatomy and pathology of the enlarged prostate were fully understood. Under ten per cent. of the prostate cases seen by the author come within the scope of those suitable for per-urethral diathermy. Present-day methods aim mainly at the removal of obvious projections, and the essential factors common to them all are perfect visualization of the parts to be removed, an adequate agent for removal—namely, a coagulating electrode or knife, punch—or an endothermy cutting loop, and a certain means of procuring hæmostasis with the aid of the diathermy current. Thus, three ways are available, they are : (1) Simple diathermy electro-coagulation, the direct outcome of the discovery of Edwin Beer, and varying little from his well-known method of destroying papillomas. The Collings-knife technique is merely a variety of this. (2) Diathermy punching; here the glandular projection is either coagulated before punching, to render it anæmic, as in Walker's, Kirwin's or Bumpus's methods, or as in Chaulk's method, where hæmostasis is procured after punching, by diathermy coagulation. (3) Resection by the endothermy wire electrotome, by the methods developed by Davis, McCarthy, Stern and Canny Ryall. Electro-coagulation has been Everidge's sheet anchor, and he has often resorted to it for cases in which, when using alternative methods, he did not feel that he had adequately overcome the obstruction. The objections levelled against it are two : (1) That the results are slowly acquired, because time must elapse before tissue sloughs away. This is not strictly true; results often come early because the tissue treated is at once softened and disintegrated, and yields to the passage of urine. It is true that it may take a month or more before all the tissue is actually shed, as is easily proved on subsequent inspection. (2) Sepsis : In the author's experience sepsis has been of a mild nature and has seldom given him cause for alarm. It usually amounts to little more than a "silent," symptomless pyuria and, occasionally, epididymitis. He had no cases of ascending, or perivesical, sepsis. Hæmorrhage, either primary or secondary, has usually been of a very mild nature.

The results have been highly gratifying, and the readiness of the patients to attend follow-up investigations and to reply to questionnaire letters bears testimony to the pleasing outcome. In fifteen cases suprapubic drainage was necessary before it was considered safe to touch the prostate. In the majority the patient's general condition had given so much anxiety as to indicate that nothing better could ever be offered. All the patients, except one, subsequently recovered, and are now passing their urine naturally and well. The exception was a definitely malignant case, in which the patient died two months after returning home. Of 75 cases, in 53 electro-coagulation alone; in 4 diathermy punch; in 3 electro-coagulation and diathermy punch; in 13 resection alone; in 2 electro-coagulation and resection. Except where he used a punch the author has had little cause for anxiety. After electro-coagulation, in only two cases was there bleeding to any extent, and only in one after resection (on the fourteenth day). With neither method has he had to open the bladder for bleeding. When hæmorrhage occurred after resection it was necessary to evacuate clots with a Bigelow, under general anæsthesia, and to tie-in a catheter. The bleeding then immediately ceased, and there was no recurrence; septic complications followed this procedure, including pyelitis with rigors, severe cystitis and femoral thrombosis. This patient (still in hospital) is slowly recovering. A mild degree of incontinence usually follows for a few days after resection. In one case it lasted nearly three months. All the patients regained perfect control. The author has met with no other complications. That per-urethral diathermy methods, with emphasis upon electro-coagulation and resection, have their place and have come to stay, Everidge does not doubt, but much commonsense and repression must be exercised lest we allow ourselves to be carried away by the whirl of the tide. The operation of prostatectomy remains upon a firm basis, and he would not say that it was even challenged, to any great extent, by these modern methods. He is not one of those who believe in the obsolescence of prostatectomy.

THE TREATMENT OF CANCER OF THE BLADDER

Electro-coagulation, radium, segmental resection, excision, and total cystectomy have all been employed in the treatment of malignant disease of the bladder, and V. S. Counseller, of the Division of Surgery of the Mayo Clinic (*Proceedings of the Staff Meetings of the Mayo Clinic*, September 13, 1933, viii, 552), publishes a critical review of the various methods of treatment. There are two avenues of approach in the surgical treatment, the trans-urethral and the suprapubic; at the Mayo Clinic it has been the practice, when the tumour is comparatively small and of low-grade malignancy, to destroy the growth by trans-urethral electro-coagulation; the more extensive highly malignant lesions and widespread lesions of low-grade malignancy are attacked by the suprapubic route, using segmental resection with disposition of the ureter when it is involved, excision, electro-coagulation, insertion of radon seeds or needles containing radium and a combination of these procedures. The highest percentage of operable lesions are in the dome and lateral walls, and therefore are more suitable for segmental resection or local excision. If the lesion is of high-grade malignancy, Judd advises opening the peritoneum so that the extent of the peritoneal involvement can be visualized and the lesion disposed of by segmental resection. Excision is more applicable to tumours of low-grade malignancy since they are not usually infiltrating and seldom involve more than the mucosa. Lesions which involve the base of the bladder present the most difficult problem. Many are inoperable as far as resection is concerned at the time of examination. Because of the poor surgical results from resection, other methods have been employed in a larger number of cases. Electro-coagulation has been used in the Mayo Clinic since January, 1925, with satisfactory results, not only for small lesions of low-grade malignancy but for transvesical electro-coagulation of inoperable lesions of high-grade malignancy of the base of the bladder. Electro-coagulation may be effectively combined with the use of radon seeds or needles containing radium. Since excellent results have been reported with electro-coagulation and radium separately, it would seem that even better results should be obtained by their combined use. The best results from total cystectomy should be secured when lesions are of a low grade of malignancy, without infection, but the chances of cure by electro-coagulation, resection or radium or their combined use in all grades and situations considerably exceed total cystectomy and transplantation of the ureters. Regardless of the method of removal post-operative recurrence or extension of the malignant growth may take place in the form of implants, either before or after operation, or by direct extension beyond the tissue removed, or along the lymphatic vessels. Nevertheless, of 67 patients who had recurrences and returned for check-up and treatment, 75 per cent. are alive and free from symptoms referable to the bladder. Some form of follow-up system is essential if the recurrent growths are to be eliminated before they become extensive and inoperable.

THE VALUE OF URINARY ANTISEPTICS

D. R. Mitchell and J. M. Scott have published (*British Journal of Urology*, September, 1933, v, 225) a report of clinical studies in urinary antiseptics and acidifiers which have been carried on in the departments of surgery and pharmacology in the University of Toronto during the past two years. In all, 70 to 75 cases have been closely investigated and a definite advance has been made in this field. The purpose of the investigation was to compare the merits of the various urinary antiseptics in current use, and to establish a point of view as to the clinical treatment of cases of pyelitis and cystitis that are not improved by surgical intervention. The patients investigated were in-patients or out-patients of the Toronto General Hospital, who were examined by the visiting urological staff, and none were accepted for treatment who could be improved by surgery, or until such treatment had been carried out. When infection persisted, focal infection from other than the urogenital tract was sought, and as far as possible corrected. The criterion of cure was sterile urine on repeated culture, and not simply the disappearance of symptoms and of pus from the urine. Bacteriologically the specimens were all examined by plate count. Suitable dilutions of urine in normal saline were intimately mixed with plain agar in petri dishes and incubated for 48 hours, when counts were made, the result being given in number of organisms per c.cm. of urine. The department of bacteriology checked the diagnosis of the organisms present. The first problem was to find out the effect an acid urine in itself might have on the growth of organisms. Hence in the first series of ten or so cases the investigators made careful observations without treatment for four or five days, noting the reaction of the urine and the bacterial counts. Then they were put on various acidifiers to try to change the p^H towards the acid side. The authors have come to the following conclusions: Ammonium chloride, acid ammonium phosphate and benzoate are effective urinary acidifiers, but change of p^H has no influence on infection. Hexamine in well acidified urine cures at least one-third of the cases of non-surgical pyelitis and cystitis. Hexamine is liberated at the kidney pelvis at least, and is as effective for pyelitis as it is for cystitis. There is no method of determining which case will respond. Resistance to formaldehyde may be due to individual characteristic of the organism. Focal infection (colonic absorption) seems to have a place in the etiology and treatment of persisting urinary tract infections. Urinary infection in simple pyleitis of pregnancy persists and only disappears post partum.

TREATMENT OF ANGINA PECTORIS

The comparative value of drugs used in the continuous treatment of angina pectoris has been critically investigated by William Evans and Clifford Hoyle (*Quart. Journ. Med.*, July, 1933, xxvi, 311). Angina pectoris is now commoner among hospital patients than has been supposed, and the authors have treated and watched 90 ambulatory patients (73 males, 17 females) with an average age of 59 years, 30 being Jews. Syphilitic angina and coronary thrombosis were excluded, all the patients analysed giving a negative Wassermann reaction. The patients were very carefully investigated; they were put on placebos, such as gentian, for a period and then on some of the various drugs employed for angina, and the results in the respective periods compared on the basis of the number of attacks which the patients were instructed to record in a diary and report at their fortnightly visits to the out-patient department. A large number of drugs such as morphine, sodium nitrite and other well-known vaso-dilators, iodide of potassium, luminal, chloral, phenacetin, diuretin, belladonna, digitalis, lacarnol which is said to contain a cardiac hormone which dilates the coronary arteries, and harmol which also exerts this action. With one exception a measure of improvement appeared to follow every remedy tried, but at least as great improvement occurred during treatment with a placebo. It thus follows that none of the drugs given in the routine treatment can diminish the frequency or severity of the attacks.

PRACTICAL NOTES

THE TREATMENT OF PRURITUS ANI

The following treatment for this most distressing condition is based on the principle of keeping the area as dry as possible and employing effective and non-irritating antiseptics:—(1) As an aperient liquid paraffin only; (2) After evacuation and at regular intervals thorough cleansing with cold water and coal tar soap; (3) Thorough drying with a soft towel; (4) Introduction of a little adrenaline ointment into the anal canal if piles are present; (5) A teaspoonful of 1–1000 acriflavine emulsion in paraffin rubbed gently into skin; (6) As soon as irritation is checked talc powder of any good brand is used freely instead of acriflavine.

Almost every case I have seen in the past year has yielded in a few days to this treatment and has been cured within a fortnight; one case has lasted a month but none were of longer duration though quite severe. To get results quickly the various details must be carried out with the greatest care and patience.

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THE TREATMENT OF WHOOPING COUGH

It was my experience in the treatment of lobar pneumonia that led me to use large doses of vaccine in the treatment of whooping cough. The same principles hold good: (*a*) only big doses are efficient, (*b*) the vaccine should be employed as early as possible. In the case of pneumonia the doses usually given on previous occasions, i.e. 20 millions, were found ineffective, and doses of 100 millions to the adult and 50 millions to the child produced the best results. It was also found that the vaccine was most effective during the first and second days of the disease. Later on it did not give the expected results, and may cause much harm if given in the final days of the malady. I applied the same principles to the treatment of whooping cough. I gave the vaccine " C " a fair trial, but the results were very poor. Fortunately I was able to administer bigger doses by using the stronger vaccine " B," which was very satisfactory. After a long experience I came to the conclusion that 1 c.cm. of the " B " vaccine could be safely given to a child of five years or older at once. For children less than five years the dose is diminished, and an infant can be given 0·5 c.cm. with safety.

My present routine is as follows:—The case must be diagnosed as early as possible. It is a waste of time to wait for the " whoop." In an epidemic, any cough with no physical signs in the chest, with three or four expulsive coughs in one breath and congestion in the face, which is worse at night, is most probably whooping cough. As soon as the diagnosis is made, 1 c.cm. of whooping cough vaccine " B " is given, or less, according to the age; the dose should be repeated after five days, and seldom more than three doses are necessary. The reaction is rarely severe. The temperature may rise to 100·5° F. or 101·5° F. and the child may appear ill. Very rarely rigors occurred. The result is little short of marvellous. The usual duration of the disease, three months, is cut to three weeks. The number of paroxysms are reduced in some cases from twenty in the day to three or four. The paroxysm itself loses much of its severity. The complications are practically reduced to nil. If the case is seen a fortnight from the *establishment* (not the beginning) of the disease, it is better to start with half the recommended doses and gradually increase them.

Summary.—Big doses of vaccine if given early are very efficient. The whooping cough " B " vaccine of St. Mary's Hospital, London, issued by Messrs. Parke, Davis & Co. for prophylaxis, has been used in *treatment* with very happy results.

A. Erian, M.R.C.P.

THE IMPORTANCE OF BISMUTH IN THE TREATMENT OF SYPHILIS

The treatment of syphilis has become in recent times largely a matter of a routine administration of arsenic in the form of novarsenobillon by injection, with or without the time-honoured mercury and iodide by the mouth. Intravenous medication has no fears for the general practitioner of to-day, possibly because of the common injection treatment of varicose veins. It is therefore of interest to illustrate the importance of bismuth, not only from the point of view of obtaining a negative Wassermann reaction, but for its high therapeutic value in intractable syphilitic skin lesions.

In December, 1931, I was consulted by a man with a primary chancre of two days' duration. He was immediately started on a course of novarsenobillon by weekly injection and orally potassium iodine and mercury in full doses. The sore quickly cleared up and no secondary stage signs made their appearance. At the end of three months, when he had received 5·8 grams of N.A.B. his Wassermann reaction was still positive and a further three months' course was initiated (second course 7·2 grams). Towards the end of this period, almost six months from the onset of the disease, a series of large raised syphilides with a thick brown scab made their appearance on the forehead, nose and scalp. The Wassermann reaction was found to be still positive and the skin lesions tended to spread in spite of intensive local and general treatment. I then augmented treatment with bismuth, giving 1 c.cm. of bisglucol (0·2 gm. bismuth metal) intramuscularly twice weekly. After four injections the skin lesions had completely disappeared and the Wassermann reaction was at last negative and remained so.

Since then I have used arsenic and bismuth together in every case of syphilis under my care, with considerable speeding up of ultimate cure and an absence of skin complications.

C. W. Kidd, M.D.

RETRO-BULBAR NEURITIS AND HERPES OPHTHALMICUS: A CASE REPORT

About a year ago I was asked by an oculist to examine and report to him on the case of a lady whom he had seen and who was a patient of mine. She had complained of sudden complete blindness of left eye, which she said she only noticed for the first time when leaving the theatre after a matinée performance. The ophthalmic surgeon wrote saying he was of opinion that she had embolism of the central artery of the left retina, that the prognosis was bad and loss of sight likely to be permanent if no change occurred in three days. The retina showed the usual signs with œdema and milk-white patches of degeneration. The lady, whose age was nearly 55, complained of no pain but was convinced that her blindness was sudden. In the course of my routine examination I found no sign of kidney disease, valvular disease of the heart or thrombosis varix. Apart from the appearance of the retina I could honestly say there was no pathological condition related to embolism and I had suspicions that the onset of the blindness was not so sudden as the lady had imagined. After close inquiry she admitted that she had had a bad "head cold," felt giddy, and had had a discharge of pus from her nose. Her sight was not quite so good in the left eye and she admitted having pain over the forehead more especially when there was no nasal discharge. It occurred to me that the case might be one of sinusitis due to influenza and the ocular trouble a retrobulbar neuritis. She was put on iodides and nasal inhalations and gradually the perception of light returned. The field of vision increased and perception of colour and other objects was restored; at the end of the third week, when she was due to see the oculist she had an attack of irido-cyclitis. This gave great pain but eventually was overcome. Five weeks after her first visit to the oculist he reported to me marked improvement in every way. He confirmed my opinion of sinusitis with severe retro-bulbar neuritis and advised prolonged treatment with iodides. At the end of six months vision in the affected eye was practically normal.

This year the same patient developed an attack of herpes ophthalmicus on the opposite side. At first there were no ulcers of eyeball but within a week iritis set in acutely. The pupil of the affected eye was reduced to a tiny slit and a herpetic ulcer was found by me at the upper quadrant of the corneo-scleral margin of right eye. The pain was very severe but yielded to cocaine, saline douches and occasional opiates. The ulcer cleared from a yellowish patch to an irregular cup-shaped abrasion. The pupil gradually dilated and assumed its formal circular shape. The iris resumed its natural colour. If another herpetic vesicle had arisen on the pupillary area of the cornea the result might have been hypopion with severe resulting scarring. Loss of sight would have inevitably followed in severe degree owing to the position of the scar and adhesions to the iris. Vision is now quite unaffected; there are a few adhesions with the iris, but my patient has had the good fortune to circumvent the danger of complete blindness by two separate illnesses affecting each eye.

R. Clark McGuire, M.B.

REVIEWS OF BOOKS

Lettsom: His Life, Times, Friends and Descendants. By JAMES JOHNSTON ABRAHAM. London: William Heinemann (Medical Books), Ltd., 1933. Pp. xx and 498. Illustrations 144. Price 30s.

THE attractive personality of this quaker physician, a founder and benefactor of the Medical Society and himself the biographer of his friend, John Fothergill, also a member of the Society of Friends, has for more than a century stimulated members of his profession to do him justice, among whom are J. T. Pettigrew (3 volumes, 1817), Sir StClair Thomson (1917), Dr. Hingston Fox in "John Fothergill and his Friends" (1919), and now Mr. J. J. Abraham, who gives an excellent account of the features of that time, much information about the medical world of London, and appropriately dedicates it to Mr. Hugh Elliot, in memory of his great-great-grandfather, John Coakley Lettsom (1744–1815). Lettsom is later described as the most famous of the quaker physicians who practised in London in the eighteenth century with the possible exception of his patron, John Fothergill, whom he copied and emulated. Thomas Young (1773–1829) was born a quaker but dropped the outward characteristics of a "Friend" before he became qualified, and though he was the most famous man of science ever to enter the profession, he was not so from the point of view of a quaker physician, so the author's statement may be fully accepted. Lettsom was remarkable from his birth, for his mother had seven sets of male twins, the last of which, John Coakley and Edward (of whom practically nothing is known) were the only survivors; Lettsom had eight children, but it does not appear that the hereditary tendency to twins was manifested in his progeny. He was a man of enormous energy and took an active part in numerous enterprises and advances, such as the Royal Humane Society, the Sea Bathing Infirmary at Margate, which he founded in 1791, and Jennerian vaccination. In 1773 Lettsom founded the present Medical Society of London, and Mr. Abraham clearly distinguishes it from other societies in London with practically the same name, a confusion which has been a pitfall for many other authors. Though a quaker, Lettsom was a keen controversialist; he and Sir John Elliott quarrelled over their biographies of Fothergill, and Elliott lampooned Lettsom in "The Character of Dr. Wriggle, or the Art of Rising in Physic" in 1782. This beautifully got-up volume, with its most effective illustrations, must have entailed long and arduous research, but the easy style with which those who remember the author's earlier work, "The Surgeon Log" are familiar, artistically obviates any suggestion of the midnight oil, and presents the reader with a story brim-full of interest.

Surgery of the Thorax. By T. HOLMES SELLORS, M.Ch., M.A., B.M., F.R.C.S. London: Constable & Co., 1933. Pp. xxiii and 519. Illustrations 140, including 11 plates in colour. Price 22s. 6d.

THE author has written a review of modern thoracic surgery which displays his familiarity with the work and writings of many specialists in this branch of surgery. It is a small volume, yet so widely comprehensive that nothing other than a brief summary is possible within its limits. It is, therefore, surprising that he has thought fit to include pharyngeal pouch among his subjects even though it masquerades as œsophageal diverticulum, especially as he has no more to say of it than what is to be found in every surgical textbook, and the one-stage operation of Trotter for the cure of this condition seems to be entirely unknown to him. The opening chapters deal with the anatomy and physiology of the lungs and pleuræ, and here open pneumothorax is discussed. Mediastinal flap, so formidable in thoracic operations, is described with its causation, but the physical bases of certain alleged associated movements of gases in the two lungs are by no means clear, and indeed the first twelve lines of page 63 are incomprehensible. In empyema the author is enthusiastic for "closed drainage," but he does not distinguish those cases for which it is especially suitable, nor does he give any idea of how long in practice a "closed" system remains air-tight, though obviously for efficiency it must be dependent upon the close fitting of a tube in soft parts liable to yield to pressure. The treatment of lung abscess is well and clearly described, the indications for an expectant attitude, aspiration, drainage and thoracoplasty are definitely stated, and this excellent description is the best thing in the book. Thoracoplasty for other conditions is adequately dealt with, as is the treatment of chronic empyema. The sections devoted to the graver operative procedures are less satisfactory, and the accounts of the methods of lobectomy fail to convey any clear idea of how so much safety as now obtains has been achieved, though the author stresses his view that it should be carried out more frequently than it is to-day. The style is fluent, abbreviations are the rule, and though the reader may be able already to understand the special meaning of the letters "A.P.," if not technically initiated he must learn that "V.C." means vital capacity. On p. 443 there is a picture of a patient suffering from an innominate aneurysm who was subjected to an operation; eleven days later "it burst dramatically," but we do not see any drama in such a catastrophe, though perhaps we are behind the times. The printing and illustrations have all been the subject of great care and we congratulate the author and publisher.

Cutaneous Neoplasms. By Norman Paul, M.B., Ch.M. London: H. K. Lewis and Co., 1933. Pp. xii and 153. Illustrations 62. Price 10s. 6d.

Malignant disease of the skin is specially common in Australia, and as the author pointed out in 1918, is favoured by exposure to actinic rays of the sun. During the sixteen months ended October, 1932 the Radium Department of Sydney Hospital, where Dr. Paul is physician for diseases of the skin, treated 602 cases of rodent ulcer, 161 of epithelioma of the skin, and 394 of keratosis. In addition to sunlight the relative low humidity of the atmosphere has been regarded as a causal factor of the great prevalence of skin cancer in Australia. Age and sunlight combined rather than the latter alone are concerned in the causation of rodent ulcer. Xeroderma pigmentosum, however, in which the skin being congenitally defective reacts to the external stimulus of light with the production of freckle-like pigmentation, telangiectases, atrophic spots, warty growths, indolent ulcers, and epitheliomas, is extremely rare in Australia. Paget's disease of the nipple and other parts of the body is described, and twenty pages are devoted to squamous-celled carcinoma, including a section on those due to X-rays, and another on multiple squamous-celled growths in which hereditary predisposition and light are exciting factors; though the latter is described separately from Xeroderma pigmentosum, it appears to be in an analogous class without telangiectasia and pigmentation. A number of uncommon skin growths are described, and the excellent photographs and photo-micrographs should be of value in clinical and histological work.

Baths and Medicinal Waters of Britain and Europe : A Handbook for the General Practitioner. By MICHAEL G. FOSTER, O.B.E., M.D., F.R.C.P. Bristol: John Wright and Sons, 1933. Pp. vii and 225. Price 12s. 6d.

WITH an experience of forty winters spent in practice on the Riviera and twenty summers at Harrogate, and as joint author, with the late Sir Hermann Weber (1823–1918), of the article on "Climate in the Treatment of Disease" in Allbutt's *System of Medicine* (1896), it is not surprising that Dr. Michael Foster has written such an admirable handbook on spa treatment. To be complete, as it certainly is, a great deal of detailed information is essential, and for this a graceful acknowledgement is made for facilities readily granted to utilize the encyclopædic work on *Climatology and Balneology* by Sir Hermann and Dr. Parkes Weber. The text also shows historical and other touches which add an interest to the information. Dr. Foster is a firm believer in the inherent value of spa treatment; some, indeed, might regard with envy his experience that in the early stages of hepatic cirrhosis, even when there may be a "considerable degree of ascites, the bold use of mineral waters may effect a cure." The arrangement of material into sections on the selection of a spa, the diseases suitable for spa treatment, the internal use of natural medicinal waters, baths, and on the details of the individual spas, is eminently convenient, and the whole plan of the index is exceptionally useful: the diseases which can be suitably treated are listed under the headings of the spas, and the suitable spas are given under the headings of the individual diseases, so that, for example, a practitioner at once finds twenty-six spas available for a gouty patient.

Combined Textbook of Obstetrics and Gynæcology. By J. M. MUNRO KERR, M.D., F.R.F.P.S., F.C.O.G., J. HAIG FERGUSON, M.D., LL.D., F.R.C.S.E., F.R.C.P.E., F.C.O.G., F.R.S.E., JAMES YOUNG, D.S.O., M.D., F.R.C.S.E., F.C.O.G., and JAMES HENDRY, M.B.E., M.A., B.Sc., M.B., F.R.F.P.S., F.C.O.G. Second Edition. Edinburgh: E. and S. Livingstone, 1933. Pp. 1,100. Illustrations 497. Price 35s.

THE demand for a second edition of a textbook is definite proof that it has found favour in the eyes of a considerable section of students, and so long as it is kept up to date it is sure of a long life. This is particularly gratifying in this case as the textbook is written on entirely new lines. Owing largely to the fact that operative gynæcology is a later development than obstetrics there has been a tendency to treat them as separate subjects and text-books are provided for each. The tendency in Great Britain has always been to teach these subjects as parts of a whole, and it is difficult to find a reason why this is the first textbook to follow this custom. By this method much space is saved as the chapters on anatomy and physiology, which are common to both, need not be repeated. The student will realize from such a book that normal pregnancy, labour and the puerperium are in reality true physiological processes, and departure from them is usually due to abnormal physiology and not to pathology. Even more important is the realization that a large number of gynæcological ailments are directly attributable to obstetrics. In this way—and in this way only—will the student understand that normal obstetrics intelligently supervised and free from meddlesome interference definitely means a reduction in gynæcological troubles. In this edition the whole book has been completely revised, much of it re-written, and new chapters on "The Infant and its First Month" by Professor Charles McNeil, and "Radiology" by Dr. J. Duncan White have been added. This work by four men of large teaching and clinical experience, is all clearly written in simple language which should make it readily understood by the student. It is well printed on good paper and profusely illustrated by drawings which really do bring out special points, and can be strongly recommended to all students and practitioners.

Text-book of Pathology. By ROBERT MUIR, M.D., Sc.D., LL.D., F.R.S. Third edition. London: Edward Arnold & Co. 1933. Pp. vii and 957. Figs. 546. Price 35s.

PROFESSOR MUIR'S position in the pathological world of this country was well described, when he delivered the Lister oration before the Canadian Medical Association in July, as corresponding to that occupied in medicine by the late Sir William Osler. It is therefore in no way surprising that since the second edition of his textbook appeared in 1929, it has been reprinted in 1930 and 1932, and is now in its third edition. There are, of course, considerable alterations; the number of pages is 80 more and of illustrations 45 more than in the previous edition. Parts of the text have been rewritten, and it is unnecessary to labour the obvious statement that additions have been made, necessitated by new work, such as that of Zondek and Ascheim on the pituitary hormones, prolan A and B, and their relations with the ovary, and Dr. J. Niven's culture-tissue work which has a bearing on Carrel's trephones or repairing substances regarded as provided by the leucocytes.

Handbook of Tuberculosis Schemes for Great Britain and Ireland. Seventh Edition. London, 1933. Pp. vi and 162. Price 5s., post free.

THIS useful guide to information of a very varied kind and concisely presented in a form nowhere else available, is brought out by the National Association for the Prevention of Tuberculosis, Tavistock House North. It enables the reader to find out at once the names and addresses of the Tuberculosis Officers, Dispensaries, Care-Committees, hospitals and settlements for the tuberculous. It also provides information about the population and deaths from tuberculosis—pulmonary and other forms—in the various counties. There is a useful alphabetical list of residential institutions—official, voluntary and proprietary—for the treatment of tuberculosis.

NOTES AND PREPARATIONS

PENTNUCLEOTIDE

Pentnucleotide (formerly called nucleotide K-96) is a mixture of the sodium salts of pentose nucleotides, prepared under the direction of the committee on nucleotide therapy of the Harvard Medical School, and marketed in this country through Messrs. Menley and James (64 Hatton Garden, London, E.C.1). Nucleic acid has long been recognized as having the property of stimulating leucocytosis, often after a preliminary leucopænia, and in 1924 H. Jackson demonstrated pentose nucleotides in normal human blood; more recently C. A. Doan (*Journ. Am. Med. Assoc.*, 1932, xcix, 194) suggested that the bone-marrow may normally be stimulated by the disintegration products of leucocytes. H. Jackson and others reported in 1931 (*Folia Hæmat.*, 1931, xliv, 33) a marked temporary improvement in a case of acute myeloblastic leukæmia following the injection of pentose nucleotide, and at their instigation a soluble, stable and non-irritant solution of pentose nucleotide was prepared under the trade name of K-96. Later, the same investigators reported (*Journ. Am. Med. Assoc.*, 1931, xcvii, 1436) their results in the treatment of 20 cases with this preparation; 7 out of 13 cases of agranulocytic angina recovered, 5 cases of malignant neutropenia were treated and all recovered, and the rapidity of recovery of 2 cases of chronic benzol poisoning was much hastened. In this country, Ernest Bulmer (*Lancet*, May 27, 1933, i, 1119) recently reported a case of agranulocytic angina successfully treated with pentose nucleotide, which is apparently the first case treated by this method in this country. Not only in agranulocytic angina and in infections with leucopænia, but in conditions such as pneumonia and in chronic infections, such as influenza and typhoid fever, where the prognosis is at times rendered more grave by a complicating leucopenia, pentnucleotide may well be found to be a logical means of raising the white blood cell count and deserves a thorough clinical trial.

VAGOTONINE

Vagotonine, to which a brief reference has already been made in our pages (THE PRACTITIONER, May, 1933, cxxx, 530), is a new hormone isolated from the pancreas according to the technique devised by Santenoise, of Nancy, and his associates, and manufactured in France by the Byla Laboratories, whose British agents are the Anglo-French Drug Co., 11–12 Guilford Street, London, W.C.1. Vagotonine apparently exerts an important regulatory action on the functional activity of the organo-vegetative system. It increases reflex excitability and the tone of the para-sympathetic, and at the same time diminishes the tone of the sympathetic. It lowers the vaso-constrictor tone, and in cases of arterial hypertension exerts a depressor effect which differs from that of other hypotensive agents in that the fall of blood pressure is delayed, progressive and prolonged, and is not followed by a hypertensive reaction. It is not only useful in hypertension and in paroxysmal tachycardia, but in diabetes its use increases tolerance of carbohydrates and, associated with insulin, diminishes the quantity of insulin required and increases the intervals between injections.

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ON CONSTIPATION AND ALLIED PROBLEMS

By CHALMERS WATSON, M.D., F.R.C.P.E.
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IN his admirable book on the digestive tract, "A radiological study of its anatomy, physiology and pathology," A. E. Barclay avoids defining constipation on the ground that any definition leads not only medical men, but also their patients into a fundamentally false conception :

> Each case is an individual, and this fact must not be lost sight of merely for the sake of making a definition. Some patients are always out of health if a daily action is not obtained, while others may regain health when they cease to worry their intestines into daily actions and revert to a habit of twice a week. It is for the patient and his medical man to find out what Nature designed for that individual. Every engine has an optimum speed at which it is not only most efficient, but at which it works most smoothly and lasts longer.

While most physicians will admit a big element of truth in this pronouncement, they will also recognize the dangers associated with a half truth. The time the engine is going to last is only known at death. There is more than a grain of truth in the adage—you never know whether or not a man is healthy till he is dead. It is the more important to keep an open mind on this subject when we recognize the extraordinarily limited nature of our knowledge of the exact causation of so many of the common diseases of every-day life which fill our hospital beds to-day. No one yet knows to what extent constipation is an important etiological factor in the development of cases of chronic nephritis, cerebral hæmorrhage, chronic myocardial degeneration, rheumatoid arthritis, gastric ulcer, disease of the appendix and the gall-bladder, and other conditions that abound in our hospitals. For many years it has probably been too much the fashion to minimize the possible importance of " auto-intoxication "—an admittedly unhappy term—because of lack of " scientific " evidence in the form of a product in the test-tube or on the microscopic slide. There is undoubtedly much truth in the statement that the laboratory is the pacemaker of medical progress, but this conception has, in my view, been seriously overworked. We may yet come to recognize that the teaching of Bouchard, Metchnikoff, Arbuthnot Lane, and that of many of the old-time physicians is much nearer the mark than is commonly believed. The present writer inclines to this view. The important subject of constipation and allied " simple " disorders is ably discussed in the articles which follow. I propose to limit myself to making some general observations on a line of thought which, in the main, receives little or no attention in relation to the subject. My attention was drawn to this very many years ago, and its great importance has, with increasing experience, been more and more impressed on my mind. This centres round the action of the diaphragm in health and disease. Have we too much neglected the study of the function of this organ in its relation to the onset of disease, and more especially of constipation ?

PHYSICAL THERAPY : A PERSONAL EXPERIENCE

More than thirty years ago I was impressed by an article on massage and physical therapy written at my request by a Swedish masseur for the " Encyclopædia Medica." In sequence, and for no particular reason, I subsequently took a course of six weeks' physical therapy in order to gain some first-hand knowledge of the methods and results. The treatment occupied half-an-hour and consisted largely of massage and remedial exercises admirably adapted to improve general muscular tone and promote an improvement of the peripheral and abdominal circulation. The points that most impressed me were the attention paid to the action of the diaphragm and of the spinal cord, the former being promoted by deep breathing—abdominal respiration—both at the beginning and end of each treatment, the latter consisting of manipulative movements in the prone position, the massage being well adapted actively to increase the circulation in the cord. The latter was applied immediately after the initial breathing exercises in the erect position. The physiological effects of the treatment impressed me most favourably and I have had abundance of opportunity of proving its great value since that time. What is the diaphragm, what is its influence on the healthy functioning of the abdominal viscera, and is the lack of that influence an important factor—and possibly the most important factor—in the later development of many " diseases " of near and remote origin?

THE DIAPHRAGM: ITS ANATOMY AND PHYSIOLOGY

In relation to the investigation into the causes of diseases of unknown origin—and these are very numerous—there is much truth in the statement (Barclay) that, unfortunately:

> Artificial bounds have arisen and in the teaching schools anatomy reports form, physiology has charge of function, and pathology deals with disease. But in life these melt imperceptibly into one another, and to the radiologist who studies living conditions there is no artificial dividing line. The new science of radiology has thrown a flood of light on many medical problems, and will yet contribute much more when its possibilities in this direction are more widely recognized.

In this connection I have pleasure in recording my indebtedness to Professor Woodburn Morrison for his co-operation and assistance in studying the present subject.

The diaphragm is a muscular structure inserted into a central tendon, the middle portion of which is fixed by reason of the fibrous part of the pericardium which is implanted into it, being connected above with the deep cervical fascia. It is pierced by numerous structures, the sympathetic trunk and the splanchnic nerves passing posterior to the diaphragm. There are two special openings, the foramen quadratum in the right portion of the central tendon for the passage of the inferior vena cava and the œsophageal opening in the muscular substance of the diaphragm, posterior to the central tendon. This opening also transmits the two vagus nerves. The design of the diaphragm is such that during inspiration the tendency is for the œsophageal opening to close, and the foramen quadratum to open. This tends to prevent regurgitation from the stomach and avoids any compression of the vena cava. The phrenic nerve receives branches from the third, fourth, and fifth cervical nerves, and from the lower thoracic nerves and from the diaphragmatic plexus of the sympathetic. In health and quiet respiration the usual excursion of the diaphragm is about ½ inch on both sides, on forced respiration an excursion of 2¾ to 3¼ inches should take place. The position of the diaphragm in all stages of respiration is practically the same in the supine as in the erect position, but on this point some difference of opinion has been expressed.

A careful review of the above facts shows the very favourable influence which a healthy, functionally active diaphragm may exert in disorder of the circulation, through its influence on the vena cava and lymphatic system of the abdomen and lower extremities, also in disturbances of gastric function. Further, the favourable influence which a free movement of the diaphragm exerts on the functional activity of the liver and gall-bladder will be readily intelligible. Keith has suggested that the diaphragm is the chief factor in maintaining the position of the abdominal viscera, being so delicately poised that any alteration has a marked effect on the abdominal contents.

THE DIAPHRAGM IN CONSTIPATION AND OTHER "DISEASES"

If the reader has the opportunity to study this subject in the wards of a general hospital, he will find much of interest. Close observation of the patients taken at random, both in the erect and supine position, will reveal extraordinary limitations in the functional activity of the diaphragm. It will be found that on "normal" respiration the movement of the diaphragm and of the abdominal wall is very defective, and on deep full inspiration the defect is more strikingly revealed. Careful radiological examination amply confirms the existence of this defect. In not a few cases the maximum excursion of the diaphragm on deep inspiration is reduced to one-third of the normal, or much less, and irregularities in its type of action are frequently present, even to the presence of a reversal of the normal action. If this examination is extended to include the study of "healthy" people, similar anomalies are found to exist, although in a much less degree, but this fact should not be insisted on unwisely in assessing the importance of existing facts. It has to be kept in view that the measure of physical fitness and the degree of vitality of "healthy" people of all ages, accepted as normal at the present day, may be, and in my opinion definitely are, erroneous. One of the comparatively early clinical sequelæ of this condition is to be found in the urine, in the form of an apparently trifling bacteriuria with the presence of a few catarrhal or pus cells. The significance of this is apt to be overlooked and, when found, is apt to be erroneously interpreted both by the reporting bacteriologist and the clinician. Later, it may be many years after, this condition becomes more pronounced, and the clinical condition is correctly regarded as one of slight pyelitis. In the meantime, the patient's health has been insidiously undermined in other directions. A clue to the correct interpretation of the above is, in all probability, to be found in the pioneer work of the late Professor Adami many years ago on the migration of the intestinal bacteria into the tissues.

It is beyond the purpose of the present article to discuss the important part which diet plays in initiating and aggravating the above conditions. In any event, I have found from prolonged clinical study of the subject that a highly important factor in the treatment of constipation is the use of measures which restore the above disordered function of the diaphragm. The time-honoured method of the habitual use of purgatives in the relief of constipation cannot be defended from a scientific point of view. The difficulties encountered in promoting a more rational and successful treatment —largely of an economic nature—are readily admitted.

THE PRINCIPLES OF TREATMENT

The great frequency of this disease may be gauged by the statement of Barclay:

> In taking brief clinical histories of approximately 1,400 cases I have been struck with the frequency of a history of constipation and also of the presence of bad teeth removed after the onset of the symptoms.

The treatment of disease, properly considered, is the management of the patient rather than that of the disease. Anything which lowers the general neuromuscular tone of the tissues will contribute to the development of, and maintenance of constipation. Seasonal changes, changes in dietary associated with them, lack of attention to the importance of the subject with resulting failure to educate the bowel to perform its function adequately, too restricted exercise, excess of tobacco, lack of efficient mastication and deficiency of water drinking are all important contributory factors. Undoubtedly the nature of the dietary is of the first importance. Less attention, however, should be devoted to individual "vitamins" and more to the increased consumption of an adequate supply of fresh natural foodstuffs, including, more especially, a fuller supply of vegetables and fruits, as far as possible in their natural state. An intensive clinical study of dietetics in general medicine and in tuberculosis during the past three years, special attention being directed to the study of the principles and practice of what is known in Germany as the "Gerson" regime or *Sauerbruch Hermansdorfers* regime, has convinced me that the next big advance in medicine will take place as soon as clinicians and laboratory workers begin to study diet more intensively, not so much from the narrow over-specialized point of view of present-day "vitamins" as from the study of fresh "live" food on the lines to which I have called attention. It is unfortunate that movement in this direction has probably been seriously prejudiced by the recommendations made by the Ministry of Health in the 1932 report, based on the opinions of a tuberculosis expert. Pulmonary tuberculosis is very largely a problem of nutrition, and some of the problems raised thereby are, in the main, out with the outlook of modern specialism.

Attention to all of the above factors will, however, in my experience, often fail in its purpose unless special attention is paid to re-education of the natural physical means by which Nature tends to keep the body in health. There is, as a rule, little difficulty in securing the intelligent co-operation of the patient, although in many cases, on account of time and expense involved, the full measure of success obtainable by treatment is not secured. In demonstrating to a patient the mechanism of re-education of normal diaphragmatic function, stress should be laid on the expiratory phase of the respiratory movement. This should be carried out very slowly and in a fully controlled manner. The "cure" of constipation is, in my view, to be found partly in medical treatment and partly in improving the general level of education and thinking powers of the community.

THE SIGNIFICANCE AND TREATMENT OF DIARRHŒA

By J. P. LOCKHART-MUMMERY, F.R.C.S.

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BY diarrhœa is generally meant a condition in which there is undue frequency in the number of bowel actions for the individual concerned. Any more exact definition is not possible, as some people normally have two, or even three, stools daily, whereas others pass a stool only every two days, and if this has always been their custom we need not attach any special significance to it. There is not any absolute normal, though one stool a day is the rule with most people. An excessive number of stools generally means that there is something wrong, indicating careful enquiry. It may be due to a great many different conditions, and to a great variety of causes. It may result from substances in the food, such as mineral poisons, from toxins produced in the body by the action of bacteria upon the food residues, from inflammatory conditions of the intestinal tract, from the excessive secretion of hydrochloric acid in the stomach, and it occurs in certain forms of cardiac and renal disease. Apart from such conditions as these, there is a form of diarrhœa due to nervous emotion. Some persons get quite severe diarrhœa as the result of fear, anxiety or emotion. Such cases are often seen in students during examinations, and were common during the air raids in London during the war. The exact mechanism of this form of diarrhœa is not known, but it seems to be due to excessive peristalsis, as it is generally accompanied by considerable abdominal discomfort, and probably it results from an excessive secretion of adrenaline, which occurs in fear and excitement.

Some forms of food cause diarrhœa in certain susceptible individuals, and most mineral poisons have a similar effect. Sodium acid phosphate, which has the biological effect of increasing the amount of muscular energy of which an individual is capable by about 20 per cent., is liable to cause diarrhœa if given in large doses. During the war the Germans tried administering this drug to some of their storm troops before an attack, but they overdid the dose and most of the regiment were afflicted by diarrhœa at an inconvenient time. In certain individuals nux vomica, even in such small doses as 3 minims, causes quite severe diarrhœa, and, as it is a common constituent of tonics, may thus be a quite unsuspected cause of the symptoms.

A frequent cause of chronic diarrhœa is some inflammatory condition of the large bowel. If the inflammation is localized to one area, the diarrhœa will probably take the form of frequent small stools and a more or less constant desire to evacuate the bowel with little result, what is generally called spurious diarrhœa.

In chronic ulcerative colitis the diarrhœa is much more severe and there may be as many as ten to twenty stools in twenty-four hours. The stools always contain blood, often in considerable quantities, the temperature is raised and in many cases the patient becomes gravely ill. Ulcerative colitis is a most serious disease and frequently terminates fatally, though there are all grades of the condition, from a very mild inflammation to extensive ulceration. The very large area of ulceration which is present when, as is often the case, the whole colon is involved, results in a severe degree of toxic poisoning, which makes recovery very difficult. The diagnosis cannot be made satisfactorily except by a direct examination of the bowel by the sigmoidoscope. Such an examination can be quite easily made without causing any discomfort or danger to the patient, by using a small-bore instrument, and without an anæsthetic. It shows the ulcerated mucous membrane and makes it possible to gauge the severity, and to some extent, the extent of the diseased condition. Regular examinations should be made to check the progress of the disease, and to see if treatment is successful, for it is impossible to treat a case of ulcerative colitis properly without visual information about the condition of the mucous membrane. When the patient is gravely ill, with a high temperature and very frequent stools, the best treatment is immediate appendicostomy to enable the colon to be kept flushed out; this gives immediate relief and in most cases is followed by steady progress towards recovery. A very common mistake is to put the patient on a very limited slop diet. As these patients are seriously ill and waste rapidly owing to the great loss of fluid and serum, they require feeding up with good nourishing food and as the stomach and small intestine are not affected by the disease they are usually quite able to digest it. The nature of the food has little, if any, effect upon the contents of the colon, as a mutton chop and a glass of milk look much alike by the time they have been digested and passed through the ileo-cæcal valve. Washing out the colon from the anus is seldom of any use in these cases, as the colon is very irritable and will not tolerate fluid passing in the wrong direction. In less severe cases a trial may be given to the following treatment, which is often very successful. One pint of warm olive oil, or cotton-seed oil, containing 5 per cent. of bismuth subgallate in suspension, is introduced slowly into the colon while the patient lies on the left side. The patient is then rolled gently over on the right side and told to keep quiet and try to retain the injection as long as possible.

One of the most important forms of diarrhœa is the spurious diarrhœa due to local lesions in the large bowel. This is called "spurious" diarrhœa because the amount of fæcal matter passed in twenty-four hours is not excessive and may even be much less than normal, but the patient is obliged to go to the lavatory with undue frequency. This form of diarrhœa almost always indicates the presence of something wrong in the rectum or lower part of the colon. It may result from an inflammatory condition of some part of the large bowel, generally the rectum, or be the result of some lesion or foreign body which is obstructing the bowel lumen. If the lumen of the bowel is much narrowed the fæcal contents can only pass through the narrowed opening in small quantities, and the result is frequent small stools and a constant desire to empty the rectum, due to the efforts of the bowel above to force on the contents. The same result will follow the presence of a foreign body of any kind in the bowel, which tends to obstruct the opening.

In elderly persons and those recovering from a severe illness, such as an attack of typhoid or pneumonia, diarrhœa sometimes arises; the patient has very frequent small stools accompanied by considerable discomfort, and may even lose all control over the bowel, so that there is a constant leakage of fæcal matter from the rectum. These cases are often mismanaged, as it is assumed that the patient has lost control owing to general muscular weakness from the previous illness, and opium and astringents are prescribed. The real cause of this condition is impaction of hard fæcal matter in the rectum, and an examination of the rectum with a finger will always reveal a great mass of hard fæces which has slowly accumulated in the bowel and cannot be passed without help. If this mass is broken up and washed away with enemas, the patient will immediately get rid of the symptoms and regain normal control over the stools. A similar condition is sometimes seen in children, absence of bowel control being due to retention of fæces and overflow, a condition analogous to that observed in the urinary bladder.

A boy, aged four years, recently brought to the hospital, was stated never to have had any control over his bowel since birth, and it was supposed to be due to some congenital defect of the sphincter muscle. On examination there was nothing wrong with him except that the whole large bowel was grossly distended with hard fæcal matter; when this was cleared away he had perfectly normal control.

Most mistakes could be avoided if it was an invariable rule always to pass a finger into the rectum in all cases presenting any abnormality of the bowel action. The importance of this cannot be too strongly emphasized. While the mere passage of a finger into the rectum will enable a correct diagnosis to be made in most cases, it is not sufficient if the lesion is high up in the rectum. Except in very stout or muscular individuals, with a bimanual examination, the patient lying on the left side and the examiner's left hand pressing down into the pelvis from the abdominal wall, while the right forefinger is passed well up into the rectum, it is generally possible to feel any lesion, such as a growth, which is in the rectum and often in the lower part of the pelvic colon. If such an examination fails to reveal anything to account for the symptoms, a sigmoidoscope should be used. A sigmoidoscope examination is of the utmost value in all cases of diarrhœa, as it enables the condition of the mucous membrane to be seen, as well as revealing the presence of a tumour or foreign body. In cases of diarrhœa due to general, or localized, inflammation of the large bowel, direct observation of the mucosa is of the utmost importance, as the type of inflammation and its severity can only be properly gauged if its effects can be seen. If properly used there is no difficulty or danger involved in using the instrument, especially if one of the smaller type is made use of, and the examination should not cause any pain or distress to the patient. Without visual aid a correct diagnosis cannot possibly be made in inflammatory conditions of the large bowel. Radiological examinations are not so useful as direct observation, such as is afforded by sigmoidoscopic examination, but if carefully carried out are valuable by showing a filling defect, when the symptoms are due to a stricture of growth in the higher parts of the colon, and are invaluable in making a diagnosis of diverticulitis when this condition is the cause of the symptoms.

An examination of the stools is often useful, and in some cases will be of great assistance in making a diagnosis. For instance, the stools in amœbic dysentery are characteristic and the same is true in cases of sprue. Microscopical examination and culture investigations of the bacterial contents are occasionally helpful, as also are tests for occult blood, but such tests, though often carried out with considerable labour and expense, are of very little value in comparison with careful examination of the patient himself, and more particularly of the local lesions in the rectum or colon by direct observation with the sigmoidoscope.

The whole question of the treatment of a case of diarrhœa depends upon a correct diagnosis, without which any treatment is a mere guess. There are so many different causes of diarrhœa, from an egg-cup impacted in the rectum to chronic arsenical poisoning, that it is only by careful and painstaking investigation that we can hope to arrive at the correct cause of the condition, without which knowledge attempts at treatment are doomed to failure. The most serious mistakes are those in which, owing to a local examination of the rectum having been omitted, a lesion, such as a growth or a foreign body in the rectum, is not detected. Such mistakes are the result of pure carelessness, and consequently inexcusable.

THE TREATMENT OF DIARRHŒA IN CHILDHOOD

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DIARRHŒA is a symptom that is apt to be of much greater importance and severity in infancy than in later childhood, and its treatment may usefully be considered separately in the two age groups. In infancy it may occur on apparently trivial provocation, and frequently continues to a fatal termination, even when the exciting cause has been removed. The treatment of the individual case, however, must start with an attempt to recognize and remedy the cause. The responsible factors (and frequently there will be more than one) may be broadly classified as follows:—(1) *Infective* : (*a*) enteral; from contaminated milk, feeding utensils, etc. Epidemic summer diarrhœa is due to enteral infection, although no single organism can be held responsible for all cases; (*b*) parenteral; almost every infection to which the infant is liable may provoke diarrhœa. Those particularly liable to be overlooked unless constantly kept in mind are otitis media and pyelonephritis. (2) *Environmental* : a hot season, high humidity, badly ventilated rooms, chilling, irregular feeding, etc. (3) *Dietetic* : artificial feeding, particularly with ill-balanced diets rich in carbohydrate; vitamin deficiency (the incidence of diarrhœa in rachitic infants is particularly high.)

The direct effects of diarrhœa are dehydration, collapse, and disturbance of the acid-base balance from excessive loss of base in the stools. (This latter, even when vomiting is severe, generally outweighs the loss of chloride that may occur from the stomach, and a true acidosis therefore results.) Dehydration is shown at first by a rapid loss of weight and loss of elasticity of the skin, a pinched-up fold returning only slowly to its original level. Later, the sunken eyes and depressed fontanelle are unmistakable. It is often remarkable how little change is seen in the gut itself at autopsy, even in the severest cases, and treatment must therefore aim at readjusting the biochemical disturbances and remedying the state of shock.

General management.—Every case, whatever is thought to be the underlying cause, should be nursed on infective precautions and regarded as a potential source of danger to others. Scrupulous care is necessary with regard to the cleanliness of feeding utensils and to the disposal of excreta. Napkins should be changed as soon as soiled (with as little exposure of the child as possible), and should be boiled. Manipulation and movement should be reduced to a minimum. The amount of external heat advisable will depend on the temperature of the room, which should be well ventilated, but not draughty. In general, it is found most satisfactory to nurse the infant on a warm (not hot) water bed in order to keep an even temperature, and to use additional hot-water bottles when any exposure is necessary. The cot should be screened from draughts. If the buttocks become excoriated, a suitable application is: zinc oxide, 60 grains; castor oil, 2 drachms; benzoated lard to 1 ounce.

Treatment of dehydration.—When the diarrhœa is uncomplicated by vomiting, the infant may be able to take the requisite amount of fluid by mouth. This should consist principally of half-strength normal saline (½ to ¾ teaspoonful salt to the pint of boiled water), with 5 per cent. added glucose. Albumin water is of much less value. When there is vomiting or severe dehydration, however, it is necessary to give parenteral fluids, and it is important not to wait too long before doing so. The three routes most generally employed are the subcutaneous, intraperitoneal, and intravenous. The nasal and rectal " drip " methods also have their advocates, but the presence of the catheter in the nose is apt to cause restlessness, and the chances of rectal fluid being retained are usually remote.

Subcutaneous route.—With severe dehydration and loss of subcutaneous tissue, large amounts of fluid (as much as 15 to 20 c.cm. per pound of body weight) can be given without causing undue distress. The back, abdominal wall, thighs, and axillæ are all suitable sites, and may be used successively. A large bore needle connected by a length of rubber tubing to a container or large syringe is inserted for at least 1½ inches (to prevent leakage) into the subcutaneous tissue, parallel to the skin. Sterile normal saline (1 teaspoonful to the pint) is run in by gravity from the container, or injected slowly from the syringe. The tubing and needle should be full of fluid before the latter is inserted; the direction of the needle should be changed several times during the injection to spread the fluid, and the puncture wound sealed with collodion when the needle is withdrawn. Again, it is essential to avoid unnecessary exposure and to keep the infant warm during the procedure, which may have to be repeated several times. 5 per cent. glucose may be injected by this route, but stronger solutions should not be employed as they will not be absorbed satisfactorily. For each of these three procedures, the fluid used should be at 110° F. in the container.

Intraperitoneal route.—Saline and weak glucose solutions are readily absorbed from the peritoneal cavity, and if care is taken to see that the bladder is empty and the gut not abnormally distended their injection is a simple and relatively safe procedure. The same apparatus is used as for hypodermoclysis, the needle being inserted just through the abdominal wall external to the rectus sheath, half-way between the umbilicus and the pubes. Smaller amounts of fluid must be given than by the subcutaneous route, as abdominal distension is apt to cause respiratory distress from interference with the movements of the diaphragm. Strong solutions of glucose, bicarbonate, and blood should not be given by this route as they produce a sterile inflammation of the peritoneum and are not well absorbed.

Intravenous route.—This is definitely the method of choice in administering fluids when a rapid effect is desired, and the difficulties of technique are apt to be exaggerated. If hypertonic glucose solution (15 or 20 per cent.) is given intravenously immediately following hyperdermoclysis, the absorption of the saline will be facilitated. For repeated intravenous use, 5 or 10 per cent. glucose is suitable. The apparatus used[1] consists of a funnel or container graduated in c.cm. (so that the amount given can easily be read off from the fluid level) and connected by rubber tubing with the side-inlet of a Luer-Kaufmann syringe (obtainable from Messrs. Allen and Hanburys) fitted with a needle of suitable size. It is well to have a "Murphy drip" in the course of the tubing, so that the rate of flow can be seen and if necessary regulated with a screw clamp. The tubing is filled with fluid, and the container suspended about two feet above the patient. The container should be kept warm with hot water bottles. The vein chosen will depend on the case, but the scalp veins are generally the most satisfactory as they are well supported by the surrounding tissue, and any leakage of fluid can at once be detected. A suitable area of the scalp is shaved and gently flicked to bring up the veins; the application of a drop of xylol may also be found effective for this purpose. The veins are distinguished from the arteries by the fact that they appear darker and run straighter and that no pulse can be detected in them. A suitable vein is selected, and the needle inserted within its lumen for at least half an inch. The plunger of the syringe is then withdrawn. If the needle is properly in place, blood will be sucked back into the needle, and as the plunger passes the side inlet, the fluid from the container will flow into the barrel of the syringe and out through the needle into the vein. Up to 10 c.cm. fluid per pound may be given by this route. Any superficial vein may be employed, or by extending the head and rotating the face to the opposite side the internal jugular can be entered behind and below the belly of the sterno-mastoid, at the junction of its lower and middle thirds. If the internal or external jugular is used, it is essential to see that no hypertonic glucose solution leaks into the tissues of the neck, or œdema and respiratory embarrassment are likely to follow. An alternative method is to cut down on the internal saphenous or median basilic vein, and tie in a cannula or blunt-ended needle. The routine injection of fluids into the longitudinal sinus is strongly to be deprecated, as it involves the unnecessary dangers of intracranial hæmorrhage and cerebral œdema. It should only be used when other methods have proved unsuccessful. Continuous intravenous treatment,[2] for periods of many hours or several days, has given promising results in severe cases, but unfortunately the amount of skilled supervision of the apparatus necessary makes the method only practicable where hospital facilities are available. Besides providing a readily assimilable food, intravenous glucose has the merit of combating ketosis and producing diuresis with consequent excretion of toxins.

Blood transfusion.—The value of blood transfusion is debatable, and the procedure is probably contra-indicated in those cases where there is a tendency to cyanosis. The addition of fresh corpuscles to an anhydræmic and failing circulation is only likely to prove a further burden. The cases that are most likely to benefit are those in which the diarrhœa has become chronic and is associated with secondary anæmia, or those in which diarrhœa is just beginning in the course of some other illness.

Feeding.—Diarrhœa occurs far less frequently in breast-fed than in bottle-fed infants, and it should seldom if ever be found necessary to wean on account of it. If there is no infection it will usually be found that in the breast-fed infant irregular or over-feeding is responsible; this is particularly the case in hot weather when a thirsty infant will take excessive amounts of breast milk unless it is given water in addition to its feeds. In severe cases it may be necessary to take the infant off the breast for 24 to 48 hours, but the breast milk supply should be maintained by manual expression, and the infant returned to the breast for five-minute feeds as soon as possible. Or it may be found best to skim the expressed breast milk for several days before allowing the infant to suckle.

In the case of bottle-fed infants, the following scheme of feeding is suggested, though it will of course require modifications for mild cases and for the individual baby. Nothing but 5 per cent. glucose in half-strength normal saline, or equal parts of orange juice and saline, should be given for 24 hours. When there is no vomiting, and fluids in reasonably large quantities can be tolerated, these should be given at three- or four-hourly intervals. In the presence of persistent vomiting, however, it is often effective to start with a drachm of fluid, doubling the amount every half hour until the infant is taking an ounce, when it can be fed hourly and then two hourly. During the next 24 hours, skimmed milk is given in quantities sufficient to provide approximately 20 calories per pound of body weight. It is advisable not to give the feed in too dilute a form, as it is then more likely to be vomited owing to the greater bulk. Reconstituted dried skimmed milks (unsweetened) are suitable at this stage. Additional fluid should be given as water or saline between feeds. The next change is to half-cream (2 per cent. fat) milk, prepared from dried milk (e.g. half-cream Cow and Gate) or by skimming the top 2 ounces of cream off a pint of fresh milk, and subsequently the infant is gradually returned to a diet of 40 to 45 calories a pound by the addition of carbohydrate to the feeds. The calories obtained from added carbohydrate should not represent more than one-third of the total caloric value of the whole feed. It is best to make the change to full-cream milk the last stage in the programme. The danger of increasing the caloric value of the feed too rapidly must be balanced against the danger of inanition from keeping the infant on a diet below maintenance requirements for too long.

A large variety of alternative feedings have been advocated. Lactic acid milk (obtainable as " lacidac ") has the advantage that the curd is rendered finer and that more concentrated feedings can be given. Buttermilk, " protein milk " (prepared either from dried protein milk powder or the addition of cow's milk curds to equal parts of buttermilk and water), or 2 per cent. calcium caseinate added to equal parts of milk and water often give excellent results in uncomplicated cases of diarrhœa characterized by fermentative acid stools. In the much rarer cases of " protein indigestion " in which the stools are alkaline and putrefactive, whey is sometimes useful for short periods, though it is inadequate as a food for any length of time.

Drug treatment.—This plays a relatively unimportant part in the management of diarrhœa in infancy. The time-honoured " purge " with castor oil at the onset of the disease has the weight of tradition to recommend it, but it is seldom that a case is seen sufficiently early to justify its use. At a later stage it is only likely to render confusion worse confounded. Opium, on the other hand, should not be given in the early stages or when there is severe collapse, though tinct. camph. co. judiciously used in the course of the disease may be of real value in controlling the diarrhœa. Of all the drugs that have been advocated, the one least likely to do harm and which may prove effective from its purely mechanical action is pulv. cret. aromat. This can be given in ten-grain doses, three or four times a day. Brandy is another traditional remedy which should only be used with caution, and well diluted, as there is some reason to suppose it may increase any existing gastritis. Alkalis would appear to be a rational form of therapy in the presence of acidosis, and weak solution of bicarbonate may be given in the early stages if the diarrhœa is uncomplicated by vomiting. In the latter event, however, the danger of converting the acidosis into an alkalosis is a real one, and unless the blood chemistry can be accurately followed, alkali treatment is better omitted. There is a tendency for the acid : base balance to adjust itself as the dehydration is remedied.

The methods of treatment of diarrhœa in older children are in general the same as those adopted in the case of adults, but one or two procedures and conditions call for special mention. *Raw-apple diet* has been for many years a traditional folk-remedy for diarrhœa in Germany, and has recently been discovered to be of value by the medical profession. It is most suitable for children over a year old, but has also been used successfully in younger infants[3, 4]; Moro attributes its efficacy to the tannin-containing principle of the apple, and has employed it in all types of diarrhœa in childhood (including typhoid and dysentery) without ill-effect. Completely ripe apples must be used; these are scraped and pulped. One or more tablespoonfuls of the raw-apple purée are then given every one or two hours, sugar being added if necessary; no other food or fluid is allowed for at least 24 hours. As much as 20 to 50 ounces can be given daily. A gradual return to a diet containing cereal, stale bread and butter, and mashed potatoes is begun at the end of 48 hours. Relapses are treated by a return to apple diet. *Rectal wash-outs* are sometimes valuable in older children, especially when there is much tenesmus. It is best to use warm saline. They must always be carried out with the utmost gentleness, using a soft rubber catheter passed not more than three inches into the rectum. If these precautions are not observed there is a definite danger of perforating an ulcerated bowel.

Cœliac disease.—In this condition the diarrhœa is due to a failure of absorption of fat and carbohydrate, and the stools are characterized by their large size, glistening, greasy appearance, and offensive odour. They have been compared to porridge. A history of diarrhœa of this type, alternating with periods of constipation or even entire freedom from symptoms, and usually having an insidious onset during the second year of life, associated with marked wasting, abdominal distension, and peevishness, is pathognomonic. The diagnosis is clinched by an analysis of the dried stool, which shows an excessively high percentage of fat; this is, however, normally split.

As the absorption of both fat and carbohydrate is at fault, it is extremely difficult to provide a diet that is at all appetizing for the patient, and it must be emphasized at the outset that treatment is certain to be prolonged and often disappointing. A rigid diet must be strictly adhered to, but if this is done a marked improvement in the child's general health and happiness is to be expected. The following " Three-stage " diet is modified from that in use at the Children's Hospital, Boston, Mass. :—

1st stage : during institution of treatment. Half-cream lactic acid milk 8 oz. (or 4 oz. powdered protein milk with water). 5 feeds. (During this stage anorexia and loss of weight must be ignored.)

2nd stage : when stools have become less abnormal and desire for food has returned. To the above, add : Curds 1 oz., junket 2 oz., and 1 egg. Subsequently add 1 oz. minced beef, 1 banana, and ½ oz. cod-liver oil.

3rd stage : when the 2nd stage diet is well tolerated, and abdominal distension is less. Add first 1 oz. karo syrup or dextri-maltose, then ½ oz. well-toasted bread or rice, and 3 oz. 10 per cent. vegetables.

Subsequently add 3 oz. minced beef, 5 whole bananas, 3 oz. curds, and 2 oz. junket. The final diet has a caloric value of just over 2,000 calories.

It should be remembered that there is a danger of vitamin deficiency, particularly rickets, occurring in this disease; if cod-liver oil cannot be tolerated, 3 m. doses of halibut-liver oil or irradiated ergosterol should be given daily. Those rare cases of pancreatic insufficiency giving rise to fatty diarrhœal stools somewhat similar in appearance to those of cœliac disease, differ from cases of the latter condition in that they respond well to the administration of pancreatic extracts, since there is deficient splitting of the fat in the intestine. In cœliac disease, on the other hand, there is no deficiency of pancreatic ferments, and their administration is entirely without effect.

Nervous diarrhœa is not uncommon in childhood, and may be occasioned by a variety of stimuli such as emotional excitement, anxiety, and fatigue. Many cases of the so-called lienteric diarrhœa, in which the taking of food or even sitting down to a meal results in an urgent call to stool, are of this type. Treatment should be directed to improvement of the general health and of the anxiety state if such exists, rather than to the bowel. Needless to say, punishment and ridicule are likely to do nothing but make matters worse. Much can be done by avoiding as far as possible the situations most likely to cause the disturbance; it is often striking, for instance, how the fear of making an ignominious exit from church will precipitate an attack, whereas the friendly darkness of a picture-house will not. Lienteric diarrhœa is found to respond well to small doses of opium or arsenic twenty minutes before meals, especially if prescribed with that cheerful optimism best calculated to soothe a restive bowel.

The presence of *blood and mucus* in the stool should at once raise the suspicion of dysentery, especially if the diarrhœa is of sudden onset and ushered in by a convulsion, or if more than one case occurs in the house. It has recently been shown that bacillary dysentery (particularly of the Sonne type) is less uncommon in this country than was previously supposed.[5] If the diagnosis is confirmed by bacteriological examination of the stools or agglutination reactions of the blood the case should be nursed on strict infective precautions, and given daily small doses of magnesium sulphate. Polyvalent sera may be used. It is well to limit the diet to fluids at the onset, but older children can rapidly be returned to an adequate non-roughage diet. Rectal lavage with warm saline may be used with caution when tenesmus is severe.

In conclusion, it may be mentioned that both in infants and in older children one may be misled by the history. In the former, the passage of frequent small green stools due to starvation may be mistaken for diarrhœa, unless the stools are actually examined and their minute size and fluid content noted. In older children it is not very uncommon to find in patients giving a history of incontinence of frequent small fluid stools, that the rectum is loaded with a mass of stagnant fæces, the centre of which has become fluid. Owing to the child having disregarded the normal call to stool, the rectum has become increasingly insensitive, and the condition is one of "constipation-incontinence" rather than true diarrhœa. After the fæcal masses have been evacuated, treatment should consist in daily enemas of glycerin, at first diluted and then undiluted, until the tone of the rectum has returned, and a normal habit been established.

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THE MODERN TREATMENT OF CONSTIPATION

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CONSTIPATION is a failure of function and therefore only a symptom, but it is so very common as almost to justify its promotion to a disease. This frequency may be attributed to evacuation being the last of the series of intestinal activities, the last of a delicately balanced group of reactions to stimuli, chemical and physical, and to the decrease in the reactivity of the intestines from above downwards, aptly termed the "gradient of the bowel" (Alvarez). The terminal phases are naturally the prey of all too many disturbances effective at a higher level. The colon, the organ essentially concerned, is itself liable to error, but too often suffers from the sins of others.

Physiology.—The efficient working of the colon, like the rest of the intestines, depends on the integrity of the vago-sympathetic mechanism of the vegetative nervous system. This system stands in a somewhat peculiar relation to the higher but developmentally younger centres, in that it is able to function independently, as can be experimentally demonstrated, quite dissociate from them, and yet is under a certain control in the nature of a constant supervision, but occasionally more accurately described as an interference. This accounts for the intrusion in intestinal form of symptoms essentially sequent on psychogenic states or emotional imbalance, e.g. the constipation of hurry and worry. The relation of the vagus and the sympathetic may be summarized as antagonistic, the vagus causing contraction of the bowel and relaxation of the sphincters, the sympathetic the reverse. This relation is disturbed in pathological states.

The principal reflex concerned in defæcation is the gastro-colic. It may be here noted that intestinal reactions to stimuli are serial, i.e. they are not simple action-reaction make-and-break phenomena, but are an associated sequence of responses set off by a single trigger effect. The gastro-colic reflex is a peculiar serial action of the colon carried out by the longitudinal muscles. A contraction starts just beyond the hepatic flexure, moulding the contents of the transverse, and perhaps some of the descending colon, into an elongated sausage-like mass which is gently but rapidly swept forward into the sigmoid. This effect takes place five or six times a day, ordinarily after

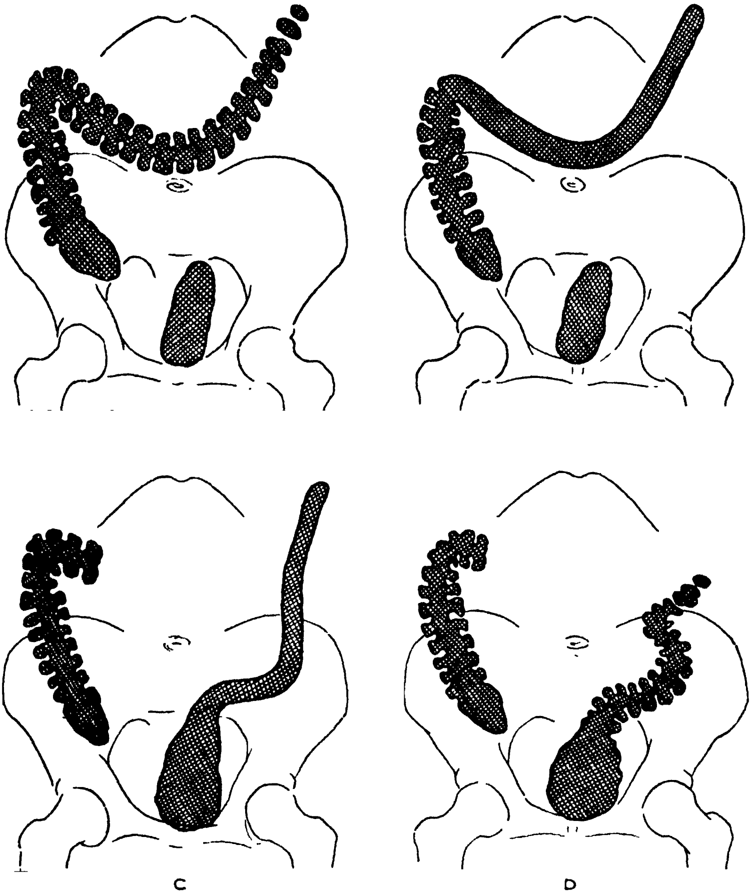


Fig. 1.—Diagram of the mass-movement of the gastro-colic reflex (after Holzknecht).

meals, the entry of food into the stomach precipitating the reflex. The mass of fæces accumulates movement by movement in the sigmoid till the culminating effect of a similar motion pushes it on into the rectum. The slight ensuing pressure here, only 30 to 40 millimeters of mercury, gives rise to the call to defæcation, when the whole available mass is extruded. The terminal act is associated with activity of the abdominal and perineal muscles, the diaphragm being held rigid in the position of deep inspiration. The details of this procedure are worthy of note. The rectal sensation of need, like the feeling of satisfaction after adequate evacuation, is normally definite and unmistakable, but if neglected or ignored the rectal mucous membrane readily becomes inured to pressure and unresponsive to call.

It may well be asked, what is adequate evacuation? For practical purposes it may be answered that a daily movement of the bowel, occurring at or about the same hour, of which the latter part of the motion is softer than the first, and which is followed by a distinct feeling of satisfaction or sense of completion is normal, i.e. the individual is not constipated. Hurst's definition of constipation as a delay of evacuation more than forty-eight hours after ingestion is generally accepted. It must not be forgotten that the rate of progress throughout the intestines is not uniform. Food, in its altered form, begins to reach the cæcum in about four hours, but will not normally reach the splenic flexture until the 12th nor the sigmoid till the 18th hour after intake.

Diagnosis.—While the possible causes of delay may be manifold and may indeed demand the nicest precision in disentanglement, the common conditions wherein constipation is the presented symptom calling for treatment belong to the large bowel.

The case history is important. The general habits; the routine of meals; their quantity, quality and times; exercise; hurry and worry; any former intestinal trouble; any local trouble; general muscular state and build; muscular damage, e.g. pregnancy; onset and progress of the symptom; its features; any associated symptoms; any reason known; treatment already tried; consideration of general health, and so forth, all warrant careful questioning. Diagnosis is largely a matter of exclusion and on the anamnesis alone a probable opinion can often be formed.

There are three main causes of constipation, the spastic colon, the atonic colon, and dyschezia.

In the *spastic* colon the constipation is irregular with normal intervals, and there is an uncertain response to purgatives, sometimes excessive, sometimes inadequate. Pain of a colicky nature and distension from gaseous excess are complained of. The motions are sour in odour rather than offensive from fermentation of the food-stuffs and there is an excess of mucus. On palpation the fingers, gently insinuated down along its course, will readily distinguish the hard rigid contracted tender descending colon, the impression conveyed being quite different from that of a fæcal mass. The transverse colon may similarly be occasionally made out. It is irritable, either from over-purgation, indiscreet dietary, undigested food-stuffs, excessive roughage, or secondary to a septic focus elsewhere. Not uncommonly it is associated with mucous colitis, duodenal ulcer or chronic appendicitis. In short, the colon is irritable because it is being irritated. This state is that of an over-active vagus (vagotonia) in sharp contrast to the next condition.

The *atonic* colon is the precise opposite, presenting a flaccid unresponsive lax large bowel. The constipation is persistent, not variable; but there is often little complaint apart from a simple sluggishness. The motions are offensive from putrefaction of the proteins, the intake of which is usually excessive, for a high protein content offers but a poor stimulus to the colon. Mucus is diminished and the fæces tend to form small hard lumps, as both roughage and fluid intake are deficient. In both types there is a tendency for the habitual dietary to be unsound. Examination shows a pendulous loose abdomen of a ptotic type; undue gurgling, splashing and very often a fæcal mass can be made out, more commonly perhaps on the right side, indicative of the cæcal stasis associated with such a colon. This syndrome is seen in chronic toxic states, local or general, and in the physical deterioration of middle-age following years of self-neglect. It is frequently associated with the next type.

Dyschezia (Hurst) is really rectal. It arises either from a failure to respond or a hindrance to respond to the desire for defæcation. Typical examples are found in constant simple neglect, the rectum becoming inured to and inattentive of the fæcal mass; in damage to the accessory musculature, abdominal or perineal; and in the presence of some local condition rendering defæcation uncomfortable, e.g. fissure. The feature is a simple difficulty, which persists. Other symptoms commonly attributed to constipation, flatulence, discomfort, headache, lassitude, and loss of appetite, are present to a greater or less extent. Examination at once discloses the feeble abdominal muscles, the torn perineum or the inflamed hæmorrhoids, and fæcal masses are felt in the rectum. Women with their poorer musculature, frequent perineal damage and mock-modest habits, present this syndrome more often than men.

Radiological evidence in every case is valuable; not essential but most helpful. It can define precisely the distinctive types. The differences between the large sluggish mass, ptotic appearance, loaded cæcum, and deficient haustration of the one; the narrow, contracted ribbon-like rigidity of the other; and the large rounded lump low down in the pelvis of the third, demonstrate clearly the fundamental pathology of the mischief and give point and purpose to treatment. Incidentally the additional advantage may be afforded of investigation of the whole intestinal tract. It must be remembered that it is from radiology that accurate knowledge of this subject has come.

X-rays are only imperative, however, in one type of constipation, without mention of which any reference to the subject would be incomplete. This is *cancer.* New growth in the colon or rectum presents two fortunate features, if any such can be; the first is that the operative results under modern surgical technique are relatively exceedingly good; the second, that it has a certain diagnostic individuality. The complaint, of a middle-aged or elderly person, is one of increasing constipation possibly with a history of former regularity, but a constipation that increases. There are usually associated periodic unaccountable attacks of diarrhœa. Two points should then never be omitted, first, to put the finger in the rectum, and secondly, to have the fæces examined for blood. It is surprising how often a growth can be felt and how seldom it fails to bleed. Radiological evidence, namely, the characteristic filling defect, must be obtained when in doubt. Every case of constipation should not be gloomily regarded as malignant, but its possibility should never be forgotten.

Diet.—This is certainly the most simple and often the most effective form of treatment; it might well be thought that if restricted to one treatment only for constipation, the choice would fall on diet. An all too common mistake is the indiscriminate increase of roughage, the cellulose content of the food; this prescription should be confined to cases in which a definite increase in mass and a definite increase in stimulation are necessary.

In spastic colon the use of roughage is unsuitable; the aim here should be to avoid as far as possible further stimulation of an already irritated bowel. Hence it is advisable to forbid tough stringy meat and the coarser harsher vegetables and fruits, especially those containing pips, skins and strings, with a view to reducing the indigestible residue. The softer forms of meat, and the simpler fruits and vegetables are permissible, but are better minced or puréed, as juices or soups, in short prepared in as bland a manner as possible. Sugars, and sugar producing foods, by reason of their fermentable qualities should be reduced. The items of choice are the dairy products, milk, three or four tumblers a day, citrated if need be; cream; raw or lightly cooked eggs; butter; and cheese, which provides both protein and fat. The whole point with such a colon is to soothe not to stimulate, to cajole not to command; such an effect will only be gained by presenting it with a smaller, blander, more innocuous mass to handle, combined, of course, with other measures proper to the purpose. Such a diet, however, must not be continued indefinitely, but should gradually be modified into an ordinary balanced regime.

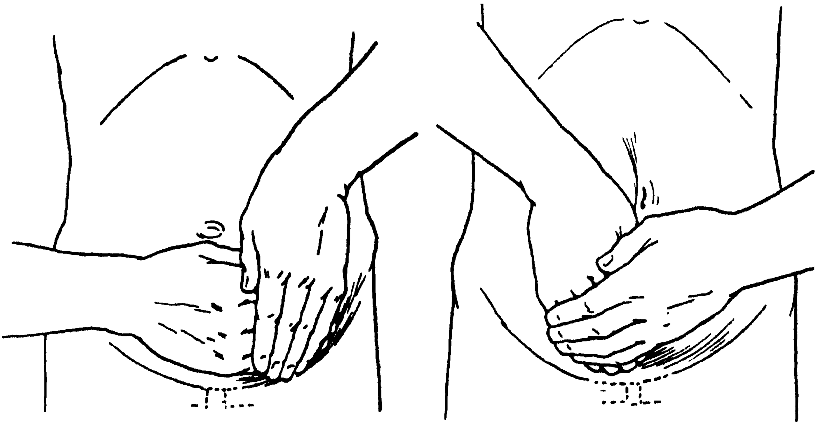
For the atonic colon, on the other hand, bulk and stimulation are demanded. Hence increase the coarser cereals, oatmeal porridge and brown bread; fresh green vegetables, salads and the like twice a day, the quantity to be about 4 or 5 oz. which is a large helping; and fresh fruit freely; but reduce the proteins to modify any putrefactive tendency though the starches may be freely allowed. The increase of quantity gives the bowel something to grip. The daily fluid intake—which must be large—should be accurately indicated. In this connection, there would appear to be a suggestive relationship between an atonic bowel and a vitamin shortage, particularly vitamin B (cereals, vegetables, yeast). The hint should be borne in mind with a view to reinforcement in the dietary arranged.

Dyschezia, too, demands dietetic modification. There should be an increase in mass, but quality must be considered as well as quantity. Hence avoid crude, large pieces of indigestible debris, and attempt to provide a soft, oily slippery bulk. Reduce proteins; increase cereals and bran; starches, potatoes and banana; the softer and simpler fruits and vegetables, but see that they are presented in a suitable form, finely chewed, chopped, minced or puréed; in particular increase fats, oil, butter and cream. The keynote here is lubrication both of passage and passenger. Where the error is functional as in the unresponsive rectum of neglect, such pursued with assiduity will suffice; but where as already indicated obvious deterrent factors exist, attention must primarily focus on their improvement. In all circumstances the opportunity offered may wisely be taken to revise the dietetic habits consonant with sound standards.

Habit.—It is not sufficient to clean the bowel, it must be kept clean, and moreover must be taught to keep itself clean. Hidden behind correction of symptomatic errors lies the principle of attaining normalcy. The necessity of a system of daily regular attention to this function by the clock, cannot be over emphasized. The only thing easier to learn than a good habit is a bad one. All patients should be instructed on this point, especially the young. Hurry and worry are real, not potential, enemies; they induce carelessness and inattention, apart from the unfavourable reaction of the psychic imbalance on general intestinal activity. In this connection may be mentioned that special type who extends a meticulous observation to every detail of his intestinal function. He is for ever tormenting himself with elaborate food restrictions and dosing himself with patent purgatives, with the result that he (or she) presents a colon as agitated and unhappy as its owner. It is unnecessary to specify the treatment.

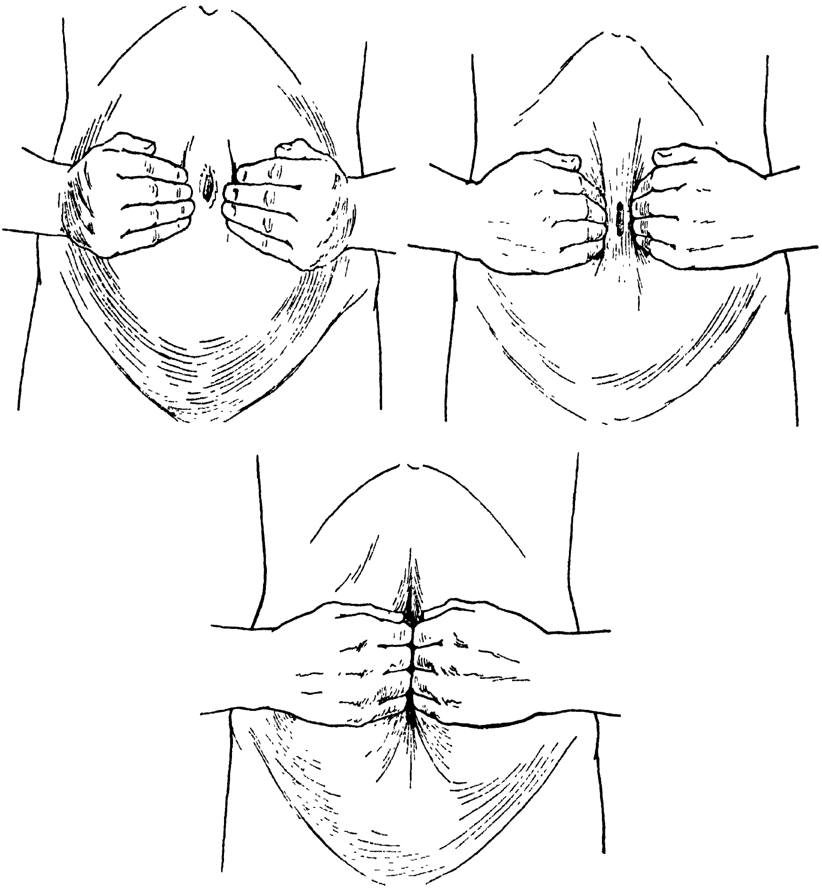
Deficient intake of simple fluids—plain water—is much more frequent than is supposed. Drinking two or three cups of tea on waking has much to commend it; it adds hot fluid in quantity at a suitable time and sets off a convenient gastro-colic reflex. The same purpose is served for others by an apple every night. Such simple measures should not be despised; they are at any rate superior to a proprietary pill. Exercise, any kind which involves improvement in abdominal tone, may be a pleasant pastime in youth; it should be a good habit in middle-age. Posture at stool is often faulty. It will be recalled that the intestines are slung from the back, i.e. the supporting angle is designed for a four-footed animal with an abdomen normally parallel with the ground; there will be better adjustment and better co-ordination of all the forces concerned when the body is bent down toward, if possible on to the knees. Stress is sometimes laid on over-smoking as a responsible agent in constipation; its importance would appear over-rated.

Exercises.—Most special exercises, however well designed for their purpose, are tedious and wearisome in performance. The three submitted below entail little inconvenience or effort and still less time, literally three to four minutes. The underlying motive is twofold: to apply, in however limited a fashion, a species of massage to the intestine, in which connection it may



FIGS. 2 and 3.—Colonic self-massage: First position and second position.

be recalled that massage normalizes muscle activity, both reducing spasm and promoting tone; and to improve the abdominal muscles, which not only act as a support for the intestine but are directly concerned with defæcation.



Figs. 4, 5 and 6.—Folding exercise. First position; second position; third position.

(1) *Colonic self-massage:* The right hand is placed transversely flat on the abdomen close to the pelvis. The left is placed vertically on the left side so that the fingers of the left hand overlap at right angles the fingers of the right (Fig. 2). A circular movement is then carried out, pressure being exerted by the butt of each hand, so that the right presses upwards over the cæcum and ascending colon and the left downwards along the descending colon (Fig. 3). The hands should be slightly lifted after each movement to avoid reversing the action. Position—lying flat;

application—100 times before rising in the morning; time 1½ minutes.

(2) *The folding exercise:* The hands are placed flat on the loins, well back, fingers together and pointed medially, the ulnar border of each hand coming just past the iliac crest. The hands are dorsiflexed and the abdomen is literally pushed (Fig. 4) in a mass medially and forwards. The fingers, more so the knuckles, are then flexed grasping on each side as large a mass of abdomen as possible (Fig. 5), and by a sweeping semi-circular movement of the hands the abdomen is folded on itself (Fig. 6). The backs of the knuckles should approximate contact. Position, application and time are the same as number 1.

(3) *The pull-in:* Respiration being regularly continued by the chest alone, the abdomen is contracted, not by the breath but by the recti and obliques and held in retraction until the sides begin to ache (Fig. 7). Respiration must continue freely without abdominal movement. This exercise can be performed unobtrusively any time, anywhere and in any position. It is of special value in correcting the loose, flabby, paunchy abdomen. Its performance tends to improve the whole carriage.

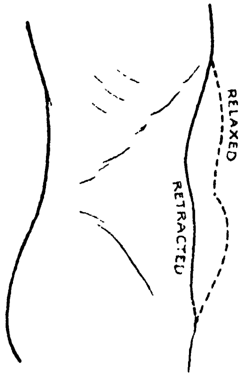


FIG. 7.—The "pull-in."

Drugs.—Medicinal treatment should be used with a certain discrimination, the choice being determined by the purpose sought. The haphazard administration of some convenient proprietary pill may serve a temporary convenience, but is in essence slipshod. Many drugs are available with a considerable variation of therapeutic purpose and utility.

Cascara sagrada is the intestinal stimulant par excellence. One of the more palatable preparations should be employed in a moderate dosage, large doses being cathartic. It has the additional merit of maintaining a regular effect even with prolonged use. Its therapeutic action is that of a re-educant, improving tone and increasing excitability, hence its value in atonic constipation. It should be given twice daily; after a short time when effective routine is being or has been re-established, the dose should be gradually and slowly reduced (but still twice daily), tailing off finally to cessation.

Atropine possesses a specific vagotropic action and is thus of inestimable value in the relief of spastic intestinal states wherein the vagus is over-active. Spasm is commonly irregular in distribution and degree; atropine tends to normalcy of tone and contractility. It will alone suffice in many of the hyperactive cases. The pure drug is superior to belladonna and the commencing dose (t.d.s.) need not exceed 1/150 gr. (0·0005 gm.). Atropine is one of the most reliable intestinal medicaments.

Salines alter osmotic tension and so increase fluid retention (or reduce absorption); moreover they relax all the sphincters. Hence their utility when relaxation and increased fluidity is sought. But they should be given—the individual form is not material—regularly every morning on waking in or followed by a large tumbler of hot water; and 10 minutes later another large tumbler—plain this time—or two large cups of hot tea. By this means the necessary fluid is provided, a point often overlooked. Salines are of decided value in various other conditions, which need not be referred to here.

There are several pleasant preparations available of vegetable products, such as bassorin, psyllium seeds, and agar-agar. They are composed of a mucilaginous material possessing the two qualities of being non-absorbable by the bowel and swelling by the absorption of fluid into a loose, soft, bulky semi-solid mass. They thus offer a medium of increase of colonic bolus of a bland non-irritating nature, which is not stimulating save by bulk alone. They should also be given night and morning.

The paraffin group are also non-absorbable and non-irritating. But they have no bulk, their action being solely that of mechanical lubricants, hence they possess perhaps the most general applicability. They are of particular value in dyschezia, with or without other adjuvants, for reasons sufficiently obvious. Here again the dose should be divided and taken two or three times a day. The principle of the distribution of doses, or their administration two or three times a day, is to attempt to obtain and maintain better physiological activity. Persistent regular minimal stimuli are obviously superior to a single sharp effect; just as a general admixture throughout the fæces of paraffin, etc., is likely to obtain a better result than a single large dose reaching the desired point at an uncertain hour.

A wise discretion will allow, if not advise, a judicious combination of drugs. The spastic colon, for instance, calls for atropine to normalize function, and in one form or another the exhibition of this drug should be persisted in for some time. Benefit may be obtained by the addition of paraffin or perhaps agar-agar. In the atonic case increase in mass and fluid should precede any increase in stimulation; hence a course of bassorin combined with saline has advantages. Later the re-educant effect of cascara will improve the deteriorated tone of the intestine. The local error of dyschezia demands local treatment, enema or suppository, plus lubrication, so the smooth, easy effect of paraffin or a simple oil is indicated. The dosage given by the mouth should be large, from the start, but the tendency to a distressing leakage must not be forgotten. Convenient and palatable combinations of paraffin and agar-agar are available. Stimulation (intestinal) should be discreet; it is better to work up gradually than to reduce suddenly. The underlying pathological condition will indicate how far restoration of function can be attained and on this the line of treatment should be based.

Rectal treatments.—High colonic irrigation is a valuable procedure for preliminary diagnosis or for the treatment of secondary toxic states. It acts by mechanically cleansing the whole colon and has a definite place in the difficult and obstinate case. But it requires experienced administration. Enemas of soap and water are popular, but save in emergency not deservedly so, the same effect being obtainable by normal saline with much less trauma.

Trousseau's original system of instructing the patient to go to stool at a fixed hour daily and, if without success, after five or ten minutes to take a saline enema or use a glycerine suppository, was a sane, helpful, re-educative measure, tending to reattainment of regularity. Another measure, very suitable in the case of the elderly, is the instillation at night into the rectum of a small quantity of oil. This is allowed to remain all night with usually satisfactory matutinal effect. I have never noticed any superiority of one oil over another. Glycerine suppositories are convenient and simple, and have a certain value supplementary to other measures. In dyschezia, especially when expulsive effort is poor from gross muscle damage, they will be found of use. But they should be employed for a definite reason and with a definite purpose like all other treatments of constipation.

Whatever importance may be attached to the related subjects of intestinal stasis and auto-intoxication, the unnecessary retention in the bowel of a host of micro-organisms cannot be regarded without misgiving. It will be recalled that the number present in an ordinary normal motion exceeds that of all living humanity. Simple attention to an obvious physiological routine will divert their possibly hostile aspirations elsewhere than the warm, moist culture-bed of the colon.

THE PHYSICAL TREATMENT OF CONSTIPATION

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THE four physical methods suitable for the treatment or prevention of constipation are:—(1) Massage; (2) Exercise and Exercises; (3) Electrical treatment; (4) Lavage, per rectum or by the mouth.

(1) *Massage.*—Abdominal massage for constipation has been practised for many centuries, and much improvement in the technique was effected by Ling, the founder of the Swedish system of exercises. Nevertheless, however accurate the technique, abdominal massage is of little value unless the masseur is capable of projecting his or her personality into the work, and the habits and diet of the patient are carefully supervised at the same time. Obvious as these conditions may appear, they are often overlooked, and need to be reiterated.

The cause of constipation is not known, but all recent studies on the subject emphasize the large part played by the mind. Dr. A. E. Barclay, in his recent radiological survey[1] writes:—

> "Constipation is not purely mechanical, nor is it merely a question of 'roughage,' of toxic absorption, or of a referred mental impression; a combination of these and other factors, particularly habit, makes the subject uneasy because the bowels have not acted at a certain time or because the call to stool fails. These patients often have morbid obsessions on the subject: they believe that their health depends on regular action of the bowels at a certain hour, and so many times a day. Constipation gets on their minds."

There is no doubt that a very large part of the value of abdominal massage for this condition is psychological; hence the importance of selecting the masseur with care. There may be also a real physiological value, but its extent is doubtful. No amount of massage can actually move the abdominal contents about as extensively as the voluntary movements of a hearty laugh. The tone of the intestinal musculature is not likely to be affected directly by massage to the abdominal wall, but there is a possibility that it is reflexly stimulated through the sympathetic nervous system. It is also possible that some forms of constipation may depend on flabbiness of the abdominal parietes; if this be so, it is obvious that the masseur's attention must not be exclusively directed to the anterior wall, which supports relatively little weight in the upright position, but must always include the back and pelvic muscles.

A common error in the administration of massage for constipation is to forget that the patient can be over-tired by prolonged treatment. Patients frequently remark, "My masseur comes twice a week and gives me an hour's massage." This is far too long, and much of the treatment must be mechanical; far better results are obtained from ten minutes' careful work on the abdomen and ten minutes on the rest of the body, daily or at least four times a week.

It is most important that the doctor who orders the massage should meet the masseur and the patient to lay down in general terms the "strength" he requires, and satisfy himself, by watching the beginning of the treatment, that this is suitable for the condition of the patient's reflexes, musculature and viscera.

(2) *Exercise.*—Morning exercises should provide variety, hold the attention and be interesting. Shadow golf or tennis strokes are therefore much better than dumbbells or Indian clubs, skipping, rowing machines and elastic exercisers, which can easily degenerate into a mere mechanical repetition which has little value in maintaining the good reflex

tone and posture essential to health and regular function. Exercises that necessitate holding the breath are definitely bad and usually accentuate any existing constipation; for example, " press-ups " on the floor, trunk-raising when lying on the floor with the toes under the wardrobe, and double leg-raising with the legs held straight. These exercises can only be carried out if the lower trunk muscles are held in strong continuous contraction.

It is impossible to lay down hard and fast rules for exercise. Riding, walking, running or swimming before breakfast may suit some and upset others, and exercise at this time is apt to produce fatigue and defeat its own object. It should certainly never entail hurry over breakfast and a rush to get to the office. Moreover, exercise should be regular. Many of those who claim to take " regular " exercise will admit on cross examination that from Monday to Saturday they take no regulated exercise whatever, but at the week-end they play three rounds of golf, hunt, or play innumerable sets of tennis. This type of exercise is irregular and unregulated; it may be worse than no exercise at all, and I have seen the worst type of lumbago attack those who practise it. The disadvantage of dancing and squash, exercises often suggested by the patient, is the inadequate ventilation of the dance-hall and squash-court.

Judging by the number of advertisements and booklets in circulation, many people like to follow a system of exercises. Most of these systems are bad; they entail much monotonous and boring repetition, give erroneous instruction about breathing, accentuate faulty posture, and are given up by the once ardent disciple as soon as the value associated with their novelty has worn off. Two notable exceptions are the Müller and the Hornibrook systems. The Müller system includes, it is true, a number of exercises with objectionable features, but the rubbing exercises, with the cheerful—almost joyful—swinging of the body, offer plenty of reflex stimulus to the abdominal muscles and have much to commend them. It is a good plan to make the patient buy the well-illustrated book and for the practitioner to mark the exercises which he recommends as suitable for each individual case and to rule through the others. The Hornibrook system yields a higher percentage of successful results in constipation than any other of which I have had experience. Its drawback is that the patient cannot learn how to perform the exercises adequately without a course of personal instruction. Its underlying principle is to raise the tone of the abdominal and pelvic muscles to a high degree of efficiency by methods which hold the patient's interest and always offer possibilities of further improvement.

(3) *Electrical treatment.*—When overwork, worry, fatigue or illness has led to irregularity of bowel action, diathermy or artificial sun-light treatment may have real value as a general sedative tonic. Apart from this, regular interrupted faradic stimulation of the whole abdomino-perineal musculature is the method of choice. Bergonié's chair is nothing more than a clever contrivance for bringing easily controlled and graduated interrupted faradic contractions to the muscles of the body, particularly to those of the abdomen and buttock. It is more effective as a treatment for chronic constipation when the abdominal muscles are weak than it is for reducing fat, the original purpose of the instrument.

The rhythmic myotroph is a far cheaper, less cumbrous and more easily worked modification of the Bergonié chair. The current is not so well-balanced in this portable apparatus, but clinically the two produce equally good results. Even the simple Morton Smart or Bristow coil can produce, in good hands, valuable results in toning up slack or debilitated muscles. Part of the current should always be led to a suitable vaginal or rectal electrode, so that the pelvic muscles are restored to tone at the same time. If this is not done the result is frequently disappointing. Many cases of constipation can be helped by the Bristow coil with two electrodes, one on the abdomen and the other in the vagina. A disadvantage of this method of treatment is its length, as almost daily applications for six weeks or longer are necessary to secure permanent effects.

(4) *Lavage.*—(A) *Per rectum:* It can be stated at once, categorically and emphatically, that intestinal lavage, whether Plombières, two-way, American or Suda chair, is never a cure for constipation. It may be a valuable or even essential aid at the beginning of treatment in clearing away débris and giving the bowel a " breather"; beyond this it does not go.

Of the various forms available, the German Suda chair is by far the most effective for habitual constipation; the Plombières type is the least effective. When the bowel is the seat of recent or old inflammation the two-way method is the best of all, but its technique is not easy and its application requires experience. It has, however, the great advantage that the apparatus is comparatively cheap and easy to fix up, whereas the Suda chair is expensive and complicated.

(B) *Lavage by the mouth, or the Water Regime:* The patient is given the following set of rules:—" Two tumblers, of cold water should be drunk first thing each morning. If possible the amount of water taken should be increased gradually up to four tumblers, i.e. one quart. You should then lie for a quarter of an hour on your left side, followed by five minutes on your right side before getting up." The patient is also told either verbally or in writing:—

(1) That results from the regime may be delayed up to six or eight weeks. (2) That he should continue, during the early stages, to take any purgative to which he has been accustomed, and only give it up as the improvement in his bowel indicates. (3) That it may be necessary to take the water slightly warm; in this case it is useful to have a thermos flask by the bedside. The water should be taken as cold as possible, but should not give a sensation of chill. (4) That he may expect to feel as if he had a discharge down the back of his nose and to want to swallow a number of times; this is a good sign and shows that the regime is working well. (5) That any increased frequency of urination should be slight and should have ceased by 10 a.m. If it is excessive or lasts longer into the morning than this he should alter the periods spent on the left and right sides respectively; he can experiment for himself until the amount and frequency of urination are almost normal. He will often find it helpful to diminish the time spent on the left side, to increase the time spent on the right side, or to drink his water at short intervals while dressing and not to lie down after it at all. (6) That all calls to stool should be answered, if possible, in a squatting position. (7) That motions will be considerably increased in bulk, softness and smoothness, and that two evacuations a day are usual.

The physiological processes underlying this method are not fully understood; I hope in the near future to be able to investigate them with the aid of X-rays. The following list of 20 consecutive cases illustrates the results obtainable; practically all these patients had been habitual purgative-takers from early youth.

The technique of the water regime, probably familiar to the practitioner of an older generation, is well worthy of a "revival." It has therefore been

ANALYSIS OF 20 CONSECUTIVE FEMALE CASES ON THE WATER REGIME

Case	Age	Diagnosis	Other Treatment	Remarks
1	28	Constipation	Plombières douches	Constipation better, salts down to half.
2	43	?Diverticulosis	None	Bowels now regular without salts.
3	46	?Menopausal arthritis	Plombières, intra-pelvic diathermy, brine baths.	Salts reduced to half, condition better.
4	55	Menopausal arthritis	Vaccines	Bowels better.
5	38	Rheumatoid arthritis	Vaccines	Bowels much improved.
6	49	Menopausal arthritis	Plombières, infra-red tunnel.	Bowels much improved.
7	46	Hypothyroidism	Intra-pelvic diathermy and rhythmic myotroph.	Cannot follow.
8	50	Osteo-arthritis	Off all treatment	Bowels now always regular. Rheumatism worse, no tr. 3/12.
9	54	General fibrositis	Off all treatment	Not satisfactory from bowels point of view.
10	31	Rheumatoid arthritis	Off all treatment	Bowels now regular.
11	52	Infective arthritis	Aix douches, intra-pelvic diathermy.	Bowels now acting satisfactorily.
12	53	Sub-thyroid fattiness	Rhythmic myotroph (thyroid extract).	No improvement in bowels, still taking large amount of aperient.
13	40	Infective arthritis	Intra-pelvic diathermy	Bowels now absolutely satisfactory.
14	65	Neuritis; spastic colon	Cannot attend	Constipation a little better, still taking aperients; rheumatism improved.
15	38	Hypothyroidism	No other treatment	Bowels much improved.
16	43	Myositis. ? Cause	Pool baths	Bowels now regular without salts.
17	41	Spondylitis	Vaccines, movements and massage.	Bowels now regular.
18	54	Infection of tonsils	Protein shock therapy	Bowels now regular without salts.
19	38	Sciatica, epileptic fits	No physical treatment on account of epilepsy.	"Bowels regular, never felt so fit; epilepsy better."
20	53	?Diverticulosis	Aeration baths	Bowels now absolutely regular without salts.

given in some detail as it is a method of treating constipation that yields a high percentage of success at no cost, and is equally applicable to the labourer and the well-to-do.

Reference

[1] Barclay, A. E.: "The Digestive Tract: A Radiological Study of its Anatomy, Physiology and Pathology," p. 158. Cambridge, 1933.

PAINFUL CONSTIPATION

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THE following cases are of interest in that they are cases of constipation attended with bouts of severe pain which lasted over a period of years, and which failed to get relief after prolonged treatment by diet and medicines.

Each case was found to have an abnormally long sigmoid, and was cured by resection of the redundant loop and an end to end anastomosis of the bowel. Constipation was, from about puberty, always associated with pain of spasmodic character which was felt chiefly in the left side but occasionally over the whole abdomen. At times the pain was accompanied by vomiting. Each case had been definitely diagnosed as hysteria by different neurologists. The pathology of the condition is quite clear; there seems to be no doubt that the pain is due to mechanical obstruction. The redundant loop of the sigmoid found in each case was long enough to become twisted to form a volvulus, but no evidence of actual twisting of the loop was found in any case. I think it possible that the loaded loop of the bowel became encarcerated in the pelvis. At operation no adhesions were found, and the redundant loop of colon was easily delivered into the wound, resected, and an end to end anastomosis performed. It was noticed that the colon above the sigmoid was definitely but only slightly hypertrophated, and the whole of the descending colon was very irritable, and went into irregular spasm when stimulated.

After operation in each case there has been complete relief from symptoms; aperients have been dispensed with, but the patients have at first had to be careful with their diet in that they have had to avoid excessive cellulose residue, such as lettuce and salad.

CASE REPORTS

Case 1.—Mrs. A., aged 61, first seen in May 1925. This patient gave a history of obstinate constipation since her girlhood which had been accompanied by attacks of severe pain and vomiting, coming on usually at intervals of about a week but from which she was never free for more than three months. Throughout her life she had been obliged to take increasing doses of purgatives, and when first seen was taking six vegetable laxatives each night and salts in the morning. She had been treated both in England and in the United States by diets which varied from pure uncooked fruit and vegetables to a completely residue-free diet, but in her view, the diet did not seem to make any difference to her condition. She also had a prolonged course of treatment by colonic lavage. On examination of the abdomen there was some swelling in the left iliac fossa; this appeared to be distended bowel, as it could not be felt on the following day. X-ray examination, after a barium enema, showed a long redundant loop of sigmoid, but the barium passed perfectly easily through the loop and on to the cæcum; the colon was somewhat irritable but there was no evidence of diverticulitis. On a provisional diagnosis of chronic volvulus I advised an exploratory operation. At the operation the condition previously described was found, and about fourteen inches of bowel was resected. The patient made an uninterrupted recovery, and has not had any symptoms since; she has been able to dispense altogether with aperients, and to take a normal diet. I have seen her every year since her operation, and in her own words she " has had a new life ever since."

Case 2.—Miss B., aged twenty, first seen early in 1929, was sent up as a case of left renal colic and gave a history of increasing constipation during the previous five years with attacks of severe pain in the left iliac region, accompanied by vomiting. Apart from the pain, which was stated to be of such severity as to resemble ureteric colic, there were not any symptoms referable to the urinary system, and cystoscopic and pyelographic examinations did not reveal anything abnormal. At this time the patient lived chiefly upon a vegetarian diet, and in addition to a large quantity of lettuce salad, confessed to twenty apples a day. She appeared to me to be in a neurasthenic condition, and I advised her doctor to see a neurologist, and at the same time to modify her diet. At that time I did not think that surgical intervention was necessary, neither did I advise an X-ray examination of the bowel. The neurologist confirmed my diagnosis of hysteria, and put her upon a residue-free diet. As she continued to have periodic attacks of severe pain accompanied by vomiting, which was now diagnosed as hysterical vomiting, she was again brought to see me, and I had an X-ray examination after a barium enema. This showed a large redundant loop of sigmoid, and as the barium was running through this loop the patient complained of pain, although there appeared to be no obstruction of its flow. The colon above the loop was irritable and showed irregular spasmodic contractions. After keeping the patient in bed for a period of observation I decided that it was necessary to do an exploratory laparotomy to see whether there was any mechanical obstruction. At operation I only found this long redundant loop of sigmoid with very slight hypertrophy of the colon above it. The loop was resected, and an end to end anastomosis performed and convalescence was uninterrupted. Since her operation the patient has remained perfectly well except for mild attacks of pain after an injudicious indulgence in fresh salad and apples. She is a perfectly normal young woman with no trace of hysteria, now married and bringing up a family.

Case 3.—Miss C., aged thirty-four, first seen in the spring of 1931; complained of abdominal pain, obstinate constipation and vomiting. She had already had three abdominal sections for appendicectomy and right oophorectomy, for left oorphorectomy, and for adhesions. She had had long periods of treatment including four months at one of the best known establishments for the treatment of digestive disorders. Innumerable X-rays have been taken, and in one of them attention had been drawn to a redundant loop of the sigmoid, but this condition was not associated with her complaint. After keeping her in bed under observation for three weeks I came to the conclusion that her symptoms were entirely functional, and I advised that she should be seen by a physician. Later, after further consultations, I did an exploratory laparotomy to exclude the presence of chronic obstruction due to adhesions. At this time I did not feel justified in removing the loop of sigmoid. There appeared to be an improvement after this operation for a few weeks but the patient was soon in her original condition, and consulted another surgeon who operated, and apparently performed a sympathectomy of the inferior mesenteric artery. The patient still complained of the same intense pain with vomiting. At the end of 1932 I again saw her, and I took her into a nursing home for re-investigation. After full investigation of the stools after different diets, it seemed clear that diet made no difference to her condition. She was now taking 48 senna pods a day augmented by salts in the morning, and she still failed to get a daily action. X-rays after a barium enema again showed that the pain started when the redundant loop of the sigmoid became loaded. The operation was performed and the loop resected, and an end to end anastomosis performed. Immediate relief from symptoms was obtained, although the patient developed a left side pyelitis during convalescence. Since the operation she has been able to dispense with aperients, and she gets regular action. She has, however, had one attack of pain and vomiting after indulgence in fresh salads, and raspberries, probably causing a temporary obstruction at the site of the anastomosis; it yielded to colonic lavage which showed in addition to a little blood, much mucus, and large quantities of undigested lettuce. With the exception of this one attack this patient has now been perfectly well, and free from all abdominal symptoms for six months, and has been able to dispense with aperients.

THE MODERN DIAGNOSIS OF CARCINOMA OF THE BREAST

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CARCINOMA is divided into inaccessible and accessible carcinoma. The inaccessible carcinoma develops in the interior of the body and can only be diagnosed when it has spread sufficiently to cause signs and symptoms externally or to affect the general health. From the very nature of its situation, early diagnosis cannot be expected and is only made by chance when in the search for something else. On the other hand, accessible carcinoma occurs on the surface of the body and can be seen or felt so that it should readily be recognized at an early stage. Yet the cry is ever for earlier and still earlier diagnosis. Carcinoma of the breast is accessible, the organ can be handled and examined in several different ways, and yet those who see much breast surgery know that many of the cases are inoperable when first brought to the surgeon.

I shall deal first with the causes that make this true and later with the problem of early diagnosis. Breast carcinoma is diagnosed late for various reasons, the first and most important being that element in human nature which reacts so strangely to fear. Most women know that after a certain age all tumours found in the breast are quite likely to be cancerous. On finding a lump there, a woman naturally suspects that she has cancer, but although she suspects it, in many cases she would rather die of the disease than go to a doctor. The chance of being told that it is not cancer seems too remote to be considered; the awful thought of being certain is too dreadful and she hides the knowledge from the family and vainly tries to banish the suspicion from her thoughts. Common sense, logic, health and even the chance of being saved have no appeal to her. She hugs her secret and dies many times of anxiety in hiding it. These people belong nearly always to the so-called educated lower middle classes.

I had such a case a short while ago. A woman had discovered a tumour in her breast two years previously and had kept the secret to herself. I was able to assure her that the tumour was not malignant but only a lipoma, which on removal would not return. She tried to tell me something of what she had passed through during the preceding two years; her thoughts and anxieties, her worries for her young children about to be orphaned, her sleepless nights, and her efforts to remain cheerful through it all. Poor thing, her relief was pathetic. Others will make the excuse that they could not leave their husband or their children to have the operation that they knew was necessary, but it is never the true reason.

The most outstanding case in my memory is that of the surgical sister in one of my hospitals. She was familiar with the disease in all its phases, but when she developed it herself she hid the secret, carried on with her work as long as she could and then retired from the hospital. Her disease was unsuspected until she was nearing her end and had to consult a doctor.

It is very difficult to see how this human factor can be counteracted. Perhaps it is less common then it was and education has helped and taught women to consult the practitioner at an earlier date than formerly, but I doubt whether even the most enlightened teaching will entirely do away with that inherent element in human nature—fear. Sometimes the less educated classes keep away from their practitioner until late because they are under the impression that a tumour can " be dispersed " at any time. Education will no doubt counteract this in time. There is also the careless or unobservant woman who does not discover a tumour in her breast until months after it is well established, and then perhaps comes along quite innocently because the nipple is growing in, or there is a puckering of skin over part of the breast.

I remember seeing a woman who consulted me for swelling of her hand, who volunteered the information that she connected it with a swelling she had recently found in her axilla. She was still unaware of the mass in the breast to which the other signs were secondary.

Ignorance of the presence of a tumour is more likely in fat people and those with large breasts.

I knew of a fat cook who died in hospital of ascites, the cause of which was not discovered although she was examined by many. Post-mortem the peritoneal cavity was found to be studded with carcinoma, and only then was the primary growth discovered in one of her breasts.

These reasons for late diagnosis are well understood, and some of them may or may not be righted by education. There are, however, other reasons chiefly concerned with the ignorance or carelessness of our profession which we should be able to eliminate. To do this we must know clearly the true signs of early carcinoma of the breast. I will not deal with the signs seen in well-established carcinoma, as this would be a waste of time, but with two classes only: first, the moderately early carcinoma, and secondly the really early carcinoma at the stage at which we ought to be able to diagnose it. The signs of malignancy in a tumour which can be clearly felt, and, if diagnosed to be malignant, is still usually in the moderately early stage, are simple and there are only four upon which any reliance can be placed, attachment to the skin, retraction of the nipple, glands in the axilla, and trans-illumination.

Attachment to the skin in 80 per cent. of the cases is the earliest sign of malignancy and can be said to be pathognomonic of carcinoma. In well-marked cases the skin is bound down over a wide area and is hard; the pores are dilated and the condition known as "pig-skin" develops. In less marked cases a slight creasing of the skin or a small dimple appears. In earlier cases still it must be sought for carefully, for it can easily be missed. To appreciate it the skin should be pulled up between the finger and thumb over the healthy breast and then over the suspected area, and the excursion of the skin and its freedom noted. Or the skin should be squeezed with the finger and thumb about 1½ to 2 inches apart, first over a sound area, then over the suspected one, and if any attachment to the skin is present a dimpling and creasing will be seen. A side to side movement of the skin has been recommended as a test, but it is not so reliable as the foregoing.

Attachment to the skin can be taken as evidence of carcinoma; it is never present in cysts or mastitis. It may be found after prolonged suppuration, but then there is no question of a mistaken diagnosis. There is a rare condition called "fat necrosis" in which it is present, but this so resembles carcinoma in every way that no case has ever been diagnosed in this country before operation, and it has even been mistaken for carcinoma after it has been incised.

Attachment to the skin is not present in every case, even when the tumour is well established. It is seen late in deep-seated nodules in voluminous breasts, and in fat people in whom the skin is separated from the breast by a thick layer of fatty tissue. It is earlier and more marked over superficially situated tumours in small breasts and in thin people. In such cases I have appreciated it over a nodule the size of a pea.

Retraction of the nipple is a great help in diagnosis, though unfortunately it is absent in about 80 per cent. of cases. It should be tested for by pulling forward the sound nipple and noting its excursion, then repeating the manœuvre on the affected side. Retraction of the nipple is due to the contraction of the ducts and the fibrous tissue round them. It is only seen when the tumour is situated near or under the nipple, but the commonest situation is in the upper and outer quadrant of the breast, well away from the nipple. It is not pathognomonic of cancer, as it is met with in many chronic inflammatory conditions of the breast.

Enlarged glands in the axilla are confirmatory evidence of malignancy, but mean that the carcinoma has been established for a sufficient time to infect them, and metastases must have grown, so that it is seldom an early sign in reality, though usually counted as such. In testing for them the sound axilla should be explored first. The best way for the surgeon to do this is to grasp the right hand of the patient with his right hand when examining the right axilla, or to grasp the left hand of the patient with his left hand when about to examine the left axilla. He abducts the limb slightly and passes the fingers of the other hand along the arm of the patient to the axilla until the chest is reached, allowing her arm to come to her side. He now draws his fingers downwards and forwards along and below the edge of the pectoralis major. In reality he wants to feel along the lower edge of the pectoralis minor, where the vessels are situated. Any glands in the axilla will be pulled down and will be felt to slip between his fingers and the chest wall. The manœuvre is repeated and the fingers drawn downwards and backwards along the posterior axillary wall where the subscapular vessels are situated. In this way the axillary space is thoroughly explored. Mere enlargement of the glands may appear to excite suspicion; hardness, however, is highly significant and points to carcinoma. Small hard glands are generally more serious than large soft ones; but glands will enlarge to a certain extent in almost any affection of the breast and are quite common in simple chronic mastitis.

Transillumination of the breast I have placed last; but it is our surest method of diagnosis, though it is seldom taught and has not yet taken the place it deserves in the textbooks. Indeed, apart from operation it may be and often is our only method of diagnosis in the really early cases. It is best performed with a strong curved Cameron light which is small but powerful; it cannot be carried out with a large electric torch. The patient sits opposite the surgeon in a darkened room. She sits well back in her chair and leans forward. The light is then placed under and beneath the sound breast, which is pressed upon it by the fingers. The normal breast is quite translucent to light. No shadow can be seen except sometimes that of a superficial vein which disappears as it is emptied. On examining a suspected breast, if carcinoma is present a shadow is at once seen; on moving the light behind it from side to side the shadow moves from side to side in the opposite direction like an eclipse of the sun. No other conditions with which I am acquainted will give a similar shadow; even well-marked, thick-walled cysts are partially translucent, while ordinary inflammatory conditions do not give rise to any shadow. The shadow is best seen in pendulous breasts which allow the light to get well behind the tumour. It is difficult to define tumours placed high up towards the axilla in small breasts and it may be impossible to see them in breasts of the virginal type, which do not allow the light to get behind them. Some breasts are more translucent than others, but by comparing the two sides the transillumination of the patient can be gauged.

The other signs that are insisted upon for diagnosis, such as deformity of the breasts or one nipple at a higher level than the other, necessarily include not only attachment to the skin and retraction of the nipple, but of the breast as well. Even a cursory glance at such a breast will establish the diagnosis. The appreciation of a lump felt with the flat of the hand is insisted upon as a great help by many, but in my opinion it is of no value at all. It is true that a carcinoma of some size can be so felt, but so can an acute inflammation, a cold abscess or a cyst. There are two conditions that cannot be felt—one is chronic mastitis, and the other a small carcinoma. Still less use are such signs as attachment to the muscle or to the chest wall; these are useful only to establish beyond doubt the inoperability of the case.

There is perhaps another sign that should be discussed, namely, a discharge from the nipple. This is hardly an abnormality in young women who have borne children, but in older people it is rarer and evidence that the cells of the mammary gland instead of atrophying, as is the normal process after the meno-pause, are taking on some abnormal activity. The discharge may be clear, cloudy, blue, green or very dark in colour, occasionally red from blood. The discharge is often discovered from the linen being discoloured or stiffened as it dries. It is of very little significance in cases in which the discharge is not red and it may pass off. It may, however, become more chronic and later contain blood; then it is always serious.

If the finger examines the breast close to the nipple, a pea-like swelling can often be felt, or one spot be found which if pressed upon yields more secretion than elsewhere, showing that there is a collection of fluid. But if the patient or the practitioner has pressed on this area shortly before examination nothing may be found. In such cases it is wise to send the patient away for a week to allow the fluid to collect again. If no spot can be found the patient can be reassured and told to report periodically to her own doctor for examination. If, however, it worries her and she has it on her mind, or has become frightened from what has been said, it is wiser to operate by a circum-areolar incision and remove the ducts near the nipple.

If such a spot can be found she should certainly have the area removed if the discharge is blood-stained. Such discharge is due to the presence of a wart-like growth in the duct, expanding it and partially occluding the outlet so that a collection of fluid occurs and the pea-like swelling is felt. Like warts in situations such as the tongue, the larynx, or the bladder in people of a certain age, they may remain simple, but they are also liable to become malignant, and while we must admit that such growths may never become malignant, I have long believed that no duct carcinoma starts in the breast without having first passed through a simple stage of wart growth. If these points are borne in mind the significance of a discharge from the nipple becomes obvious.

The four signs detailed, therefore, must be relied upon for diagnosis of the moderately early carcinoma. But these are not really early cases. The fact that the first three signs can be made out means that the growth has been established a considerable time, as each sign is the outcome of a certain amount of growth or spread causing contraction of the fibrous tissues—metastases in the glands. In reality we should be quite able to suspect even if we cannot diagnose malignant disease of the breast at an earlier stage than this. I have insisted on our ability to do it for years.

It has been said and said truly, that for each one of these signs that are found, the chance of permanent cure has diminished by 25 per cent. In what I consider the really early cases the first three signs are not present, but the shadow on transillumination can still be seen. Here lies the great importance of transillumination. In the early carcinoma there is not one single malignant sign present. We are not even quite certain that we can feel a tumour, although we have a very definite suspicion that there is something there. If we can get our cases at this early stage I regard them all as eminently curable. I know that this is not quite accurate, as even at this early stage some may already be disseminated, but they are few. Practitioners are inclined to say that they never get them at this early stage, to which I reply, surprising as it may seem, that I am seeing more and more at this stage, and as education increases more and more practitioners will realize that they too can see such cases if they will examine as I have recommended. It is at this stage that practitioners should try to diagnose the case.

I repeat here what I have long taught, that a tumour of the breast, however small, should be regarded as malignant until it is proved innocent—and the proof of innocence lies with the medical practitioner. That does not mean that the woman should have to wait until the tumour diagnoses itself to the practitioner. When transillumination leaves anyone in doubt, there is the sure method of diagnosis, namely, exploratory incision. If the naked eye does not complete the diagnosis the microscope can be called into play. If it is the rule to take a piece from a suspicious ulcer of the mouth, if an exploratory laparotomy is performed when cancer is only one of many conditions suspected, how much more certainly an incision should be made in a breast in which the chances of cancer against other diseases are four to one.

Needless to say, opportunities for such diagnosis rarely occur to individual practitioners, but when they do they should be kept in mind. I know from experience that the modern practitioner both here and on the Continent is beginning to realize the importance of these cases, as I see more and more of them every year. Often enough the difficulty of operating lies with the surgeon and not with the patient. I find that the woman is anxious to have the diagnosis cleared up and it is sometimes the surgeon who is not quite sure that he has sufficient justification for operation.

Some years ago a patient was sent to me with a note from her practitioner saying that she had consulted him about a tiny knot she thought she could feel in her breast. He could feel nothing but to relieve her anxiety he sent her to me. I examined her but could not honestly say that there was anything to justify operation. She appeared satisfied, but I wrote to her practitioner begging him to keep an eye on her. I saw her again in six months time; she had not been again to her practitioner in the interval, and I was horrified to find a well-established carcinoma attached to the skin. A radical operation was performed, but she was dead within two years from internal metastases. She had been right in the first instance and could feel something that I could not appreciate—it was before the days of transillumination.

Since this case I have always paid great attention to what a woman says she can feel in her own breasts, believing that she is sometimes better able to notice slight changes than a stranger, however skilful.

DEEP TRANSVERSE LIE OF THE HEAD

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ONE of the commonest causes of delay in the second stage of labour of sufficient degree to necessitate instrumental delivery, is the development of deep transverse lie of the head. In this condition the fœtal head is forced down into the pelvic cavity with its sagittal suture directed along the transverse diameter of the pelvis. This position of the head leads to delay in the second stage of labour, for forward rotation of the occiput rarely follows. Curiously enough, deep transverse lie of the head receives scant attention in modern British textbooks of obstetrics, and few practitioners and students have been taught

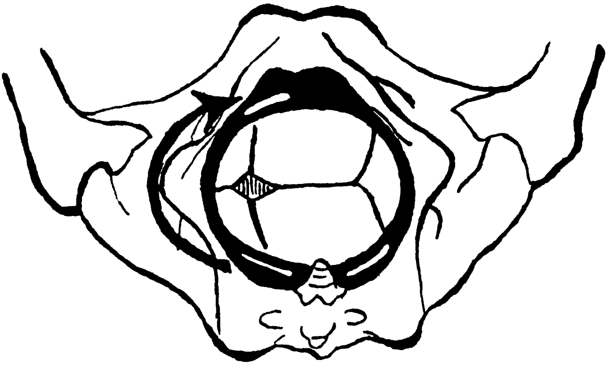

FIG. 1.—The technique of forceps delivery in deep transverse lie.

The pelvis is seen from below and the occiput is on the left side of the mother. The left blade of the forceps introduced between the perineum and the head subsequently comes to lie a little to the mother's left. The arrow indicates the method of inserting the right blade of the forceps. The blade, held in the right hand, is introduced posteriorly as before. It is then rotated through 90° partly with the help of two fingers of the left hand placed in the vagina, past the sinciput to lie anteriorly. The forceps when locked lie in the oblique diameter of the pelvis.—(Modified from Winter, *Halban-Seitz Handbuch.*)

about its frequency. This complication of childbirth was recognized by Smellie, and some importance was attached to it by the English obstetricians of the latter part of the nineteenth century. Smellie[1] gave a most instructive description of deep transverse lie of the head, and it is clear that he recognized both the position and the difficulties which may follow. It is interesting to notice that his cases are mentioned in the chapters on "Lingering and Tedious Labours."

At the present day emphasis upon the frequency and importance of deep transverse lie of the head is almost restricted to the German school. If one studies obstetrics in any of the German clinics it is surprising how frequently these cases are demonstrated. Furthermore, it is my experience with the obstetrical material at St. Bartholomew's Hospital that the commonest indication for instrumental delivery "amongst hospital patients" is deep transverse lie of the head. Continental authorities maintain that the condition arises in 1·5 per cent. of all vertex presentations, and, furthermore, all German authorities believe that natural delivery hardly ever follows this complication of childbirth. It is obvious that these cases must be met with in obstetrical practice in this country. They are usually regarded as cases of occipito-posterior presentation with imperfect anterior rotation.

Abroad a different interpretation is accepted. It should be remembered that the continental descriptions of the mechanism of vertex presentations differ very markedly from our own. Bumm always maintained that the head enters the brim of the pelvis with its sagittal suture lying transversely, even in normal cases without flattening of the pelvis, and this view is held by some American obstetricians. Again, the German school distinguish various forms of "occipital and parietal bone" presentations which are not recognized in this country. Their classification is much more complicated than ours, but I think that the views of the German school should receive more attention than they have in the past, for the great advantage of the German method is that it demands extreme care in vaginal examinations and much precision is required to diagnose the exact position of the head. Again, on the Continent the blades of the forceps are applied in relation to the position of the fœtal head, whereas in this country the accepted teaching is to apply the forceps with respect to the pelvis.

Probably a large number of practitioners will agree that they have frequently had cases in which an abdominal examination leads to the diagnosis of an occipito-anterior presentation, but when a forceps delivery has subsequently been required the head has been found lying transversely in the pelvis. This is certainly my own experience, and I would go a step further and say that in most cases of deep transverse lie of the head there has been no previous evidence of an occipito-posterior presentation. The German school admits the possibility of an " occipital bone " presentation rotating to the deep transverse position from an original posterior position, but such cases are regarded as infrequent. If it is assumed that the head enters the pelvic brim at the commencement of labour in the transverse diameter, deep transverse lie of the head is relatively easily explained, particularly so in the case of flat pelvis. In other cases deep transverse lie is seen when the baby is small, but by far the majority of cases arise when the first stage has been prolonged, when the pains have been poor and when the patient is fatigued. The etiology of such cases is obscure, for commonly there is no abnormality either of the pelvis or of the fœtus. An account of the theory of the development of deep transverse lie of the head is far beyond the scope of the present contribution; an exhaustive description is given by Sellheim.[2]

Personally, I believe that deep transverse lie results from some defect of the pelvic floor, either physical or functional, which leads to failure of forward rotation of the lowest part of the head. Deep transverse lie is not restricted to the flexed vertex; the most difficult face presentations with which I have had to deal have been when the chin has been directed to one side.

DIAGNOSIS

Deep transverse lie of the head should not be diagnosed unless the head is in contact with the levator ani muscles and no advance is being made. Fixation in the pelvis is the mark of deep transverse lie. It is clearly wrong to diagnose deep transverse lie when the head is high in the pelvis and in process of rotating through a transverse position to become an occipito-anterior. I have already pointed out that patients who were described by Smellie as having "lingering and tedious labours" should be suspect. If sutures and fontanelles can be identified the diagnosis is easily made. It is often stated that the position of the occiput can never be deduced from palpation of an ear unless an anæsthetic is first given, because the ear is not within reach. This is not the case with deep transverse lie of the head. Usually the head is so low that an ear can be palpated without difficulty. If a large caput has formed it is often necessary to give an anæsthetic before the diagnosis can be made with certainty. Frequent vaginal examinations during labour are quite rightly condemned, but if a deep transverse lie of the head is suspected, every effort should be made to diagnose exactly the position of the head.

PROGNOSIS

Premature rupture of the membranes, prolapse of the cord, and delay before full dilatation of the os should not be regarded as associated complications of deep transverse lie of the head. If they develop they are coincident. The clinical picture of deep transverse lie of the head is essentially one of delay in the second stage. The end result is secondary uterine inertia with its attendant complications. I have already pointed out that natural delivery rarely follows the development of deep transverse lie; interference and forceps delivery become essential in due course. Personally I believe that deep transverse lie is not so common as in Continental clinics where patients are delivered in the dorsal position. And it is more than possible that its incidence is even less frequent in primitive circles where the patient moves about freely during labour. Nevertheless, if deep transverse lie develops, obstetrical interference becomes imperative.

TREATMENT

In cases of "lingering and tedious labour" vaginal examinations should be made to determine if the head is lying transversely in the pelvis. If this complication is found to be developing, the correct procedure is to place the patient on the side corresponding to the position of the posterior fontanelle. For example, if the posterior fontanelle is found on the right side of the mother, the patient should be turned on her right side and not left in the customary left lateral position. The result of this simple procedure is that the uterus, and with it the trunk of the fœtus, falls over to this side and the occiput sinks lower in the pelvis. This sequel cannot be expected if the head is jammed down and fixed; if the head is movable the tilting of the long axis of the uterus is followed by the occiput being forced away from its position against the lateral pelvic wall to a lower position in the pelvis. The occiput then meets the pelvic floor and is rotated anteriorly. This procedure is essentially prophylactic, and is useless if the head is already fixed in the transverse position.

In addition to this simple adjustment of posture an effort should be made to stimulate the contractions of the uterus by the administration of pituitrin. Not more than two units of the oxytocic principle should be administered at any time. There is no better or more accurate method. Practitioners often tell me that they have never had trouble from using larger doses than this; indeed, the injection of "1 c.cm. of pituitrin" to hurry things on is almost a routine with many medical men. They forget that the uterus is sometimes super-sensitive, so that with 10-unit doses violent tetanic contractions may be induced, leading to such complications as torn cervix, complete tear of the perineum and "pituitrin shock" after the delivery of the child. Doses of two units can be administered without anxiety and the sensitivity of the uterus at once determined. The effect of pituitrin probably lasts not more than 20 minutes, and it is quite safe to repeat a dose of two units every 15 minutes.

These two procedures, postural and oxytocic, are essentially prophylactic; they are useless if the head is already fixed. Care should therefore be taken in all "suspect" cases to examine frequently by vaginal examination to determine if deep transverse lie is developing. If the head is already fixed natural delivery is not to be expected. I have seen only one case in which the head was born transversely through the outlet, and very few such cases are reported in the German literature. Forward or backward rotation of the occiput is probably still more exceptional. Interference is therefore required. What usually happens is as follows: The practitioner finds the head low down and applies forceps. He has great difficulty in applying the blades for there is little room laterally in the pelvis. Finally they are applied and he pulls. There is no advance, and after a vigorous effort he pauses to consider the position. Probably he will think of occipito-posterior; he may remove the forceps, manually rotate the head and then deliver with forceps, or he may deliberately rotate the head with the forceps until the occiput is anterior and then deliver. There are two main faults with this rather crude technique. The first is damage to the fœtus as a result of the blades being applied wrongly with respect to the head and secondly unnecessarily vigorous traction is usually employed. I have seen a young Austrian intern deliver beautifully a deep transverse lie with correct technique, and within a few months seen an obstetrician of international reputation—who had never heard of deep transverse lie—struggling almost pathetically to pull out the baby in the transverse position.

Forceps delivery may be extremely easy and it may be extremely difficult. A simple forceps delivery when the head is gently lifted over the perineum is one of the most satisfactory operations which is ever performed, and in the average case forceps are attempted with too great expectations as to this desirable result. In the average case—I am not considering such complications as inertia and disproportion—before forceps are applied it is well to know first, how far down is the head in the pelvis and, secondly, exactly how the head lies with respect to the pelvic cavity. The best method of judging the degree to which the head has descended in the pelvis is to determine the relation of the lowest part of the head to the ischial spines. The ischial spines can always be palpated with extreme ease on vaginal examination, and if any part of the fœtal skull has reached this level it is certain that the maximum circumference of the head has passed through the brim of the pelvis. The diagnosis of the exact lie of the head may be a matter of extreme difficulty when a large caput has formed. There are occasions when I believe it impossible to identify the position of the fontanelles and sutures, when the exact lie of the head can be identified only by feeling an ear. One of the main points of this article is to plead for greater precision in diagnosing the position of the fœtal head before forceps delivery is attempted. The exact lie of the fœtal head should be determined as a routine when the patient is anæsthetized before forceps are introduced.

In cases of deep transverse lie an effort should be made to rotate the head manually before forceps are applied. First the head should be flexed, and then rotated until the occiput lies anterior and not until then should forceps be introduced. This technique belongs to the British school, and so far as I know is never mentioned in the Continental textbooks. The method is better than any other available and can be employed without difficulty in most cases. Sometimes, however, manual rotation is impossible either because the head is fixed or because it cannot be flexed. In such cases forceps delivery is necessary.

The correct method is to apply forceps, not with respect to the pelvis, but in relation to the fœtal head. The technique is difficult to understand, but is simple in practice. The blades of the forceps should be applied to the head in such a way that after forward rotation of the occiput has taken place, they lie correctly with respect to the pelvis. For example, if the occiput lies towards the mother's left, the concave anterior rim of the blade should be directed towards the left. The second point is that the forceps, after insertion and when locked, should lie either in the oblique diameter of the pelvis or so that one blade lies in front against the anterior vaginal wall and the other in contact with the posterior vaginal wall. The left blade of the forceps should always be inserted first. If the occiput lies to the left, the left blade is inserted between the posterior vaginal wall and the head, and the introduction is simple. With the right blade, introduce the blade not directly towards the mother's right side where there is little room, but again posteriorly, holding the blade in the right hand, with two fingers of the left hand in the vagina. The blade is then gently rotated from this posterior position past the sinciput so that it finally lies in front, the rotation being through 90°. The fingers of the left hand help the rotation of the blade and also ease the sinciput away from the lateral pelvic wall. The blades are then locked, when it is usually found that the forceps are lying obliquely in the pelvis.

Traction is now applied. In most cases the head rotates anteriorly without deliberate rotation of the forceps being required. In difficult cases the following steps are recommended. First pull the handles of the forceps backwards in the direction of the sinciput; this pushes up the sinciput and promotes flexion. Secondly, rotate the forceps, but do so with caution. Always apply traction at the same time as a rotatory movement is given to the forceps, and if rotation is employed ensure that the handles of the forceps prescribe a wide arc. Damage to the vagina may be caused by twisting the handles of the forceps without at the same time rotating them through a large circle. A vigorous twist applied to the handles should be regarded as bad technique, for this is very prone to cause both damage to the vagina and also injury to the baby's head.

The results of applying forceps by the above method are extremely good and the technique has a sound theoretical basis. It may perhaps be thought that the head is deliberately twisted by the forceps and that damage to the fœtal head as the result of direct pressure is likely to happen. Experience shows that this is not the case; damage to the fœtal head is far less than when the blades have been applied sagittally.

The method should never be attempted unless the position of the fœtal head is known with certainty. If the forceps are applied in the wrong direction so that the concave rims of the blades are directed towards the sinciput, the head will be turned to the persistent occiput posterior position and the end result may be worse than the first.

The method which has been described above can be carried out with forceps of any pattern, and as the head is low there is no necessity to employ axis traction. The best instrument to use, however, is Kielland's forceps, which can be directly applied bi-parietally to the head even when it is lying in the deep transverse position. Kielland's forceps were advised for cases of disproportion when the head was high in the pelvis, but it was soon found that they were of particular service in cases of deep transverse lie. The ordinary patterns of forceps are all that is required in cases of deep transverse lie, but as indicated above, the application of the blade which becomes anterior after insertion is more complicated than with the usual technique.

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ANTENATAL CARE IN THE INTERESTS OF THE CHILD

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THE preparation for the management and care of the infant should begin as soon as pregnancy is diagnosed. The purpose of this article is to direct attention to the need for proper supervision and advice to the mother in regard to the infant to be born. The enormous increase in antenatal work, both at public clinics and in private practice, has led to great advances in preventive medicine and will surely lead to further ones; but hitherto all our energies have been directed to the care of the mother during her pregnancy, the aim being to assure for her, normal health, and as natural a delivery of the child as possible. The obstetrician has taken complete control, and his concern is, quite rightly, with the mother. This attitude has become so established that he takes comparatively little interest in the infant. Once the cry of the new-born babe is heard the practitioner, like the father, feels that all is practically over; but it is then that the mother's work and responsibilities really begin.

This erroneous idea has arisen to a large extent from another misconception, namely, that the reproduction period is of nine months' duration only, whereas it is actually, of course, much longer. A mother should feed her baby for, shall we say, nine months, and it is not until this function has ceased and menstruation has recommenced that we may say the cycle has been completed. Antenatal advice should, therefore, cater for an eighteen months' period and not simply for the first half of this, with labour as its final culmination.

How, then, can antenatal supervision be best put to use in the interests of the child? This may be discussed under the following headings: (*a*) maintenance of the normal reproduction period with breast-feeding of the child; (*b*) preparation of the mother in the event of expected artificial feeding; (*c*) to assist in the birth of a healthy child by correct maternal diet; (*d*) preparation and instruction in general care of the baby; (*e*) preparation for the care of the infant in the event of an expected premature birth; (*f*) preparation for the care of the infant in the event of expected disease.

(*a*) *Maintenance of the normal reproduction period with breast-feeding of the child.*—Before discussing how this may be attempted in the antenatal period, let us look at the problem from another angle. Why is artificial feeding so common to-day? The problem is not a simple one and has many facades. It is to a large extent a problem of sociology and medical education. The newly-made mother is inundated with advertisements of numerous artificial foods, each seemingly the ideal diet for her child, and during pregnancy she cannot fail to be impressed by notices on all sides extolling their virtues. It is not surprising that she takes the easy path and leaves the feeding of her baby to the nurse. The doctor also has his quota of samples and pamphlets at his breakfast table; small wonder that he also succumbs to the modern fad of artificial feeding.

The correction of both mother and practitioner lies in their proper education; the mother during pregnancy, the doctor in his training. To take the latter first: How many students are shown a mother feeding her baby at the breast? How many students are taught the technique and essentials of breast-feeding? It is pleasing to note that the General Medical Council are urging the necessity for this training, and that many hospitals are developing a liaison between the obstetric and children's departments. But until practitioners are taught the art of breast-feeding they will be satisfied to join the mother in the easy path of the bottle feed, with the directions plainly written on the tin.

The mother also is in urgent need of education. She has reluctantly decided to have a baby, and with her social engagements pressing from all sides she is anxious to complete the business as quickly as possible. With the modern tendency of small families it should be easier to concentrate the mother's energies, but in actual practice this is far from true. It is the task of the doctor, then, to instruct the mother during pregnancy in her duties to the new arrival and to herself. And so we come to the antenatal advice that may be given.

A mother is not interested to know that cow's milk contains more casein than breast milk, but she may be impressed by the fact that breast-feeding will cost her nothing, while cow's milk, or a dried milk, bottles, teats, gas to heat the milk, etc., may mount up in a nine months' period. She will be interested to learn. too, that lactation will promote the return of her womb to normality, and that her baby is far less likely to get gastro-intestinal and other ailments if fed at the breast. Recent figures, quoted by Housden,[1] of infants suffering from gastro-intestinal disorders, show that nearly 90 per cent. were bottle-fed, and such figures may well impress a hesitant mother.

The mother will surely appreciate in these enlightened days, that both she and her baby are going to gain considerable benefit psychologically from their close contact, and that a baby treated as a separate entity and fed and nursed by all and sundry will lose the love and interest that is so valuable to mother and child. It is not enough for the practitioner to talk in this, so to say, general, philosophical way. He must prepare and interest the mother in the details of breast-feeding. He should explain to her how soon after birth she will be expected to feed her baby, how long the feeds are to last, how often they are to be given, with what interval at night, etc. Once a mother can be interested—and few mothers can resist their natural instincts—in the art of breast-feeding, the battle is practically won. Any welfare worker recognizes that once a mother has decided not to feed her baby " because the milk doesn't agree " or " because she doesn't think she has enough milk " the struggle to continue or re-establish breast-feeding is, indeed, a hard one.

The mother and the practitioner should take active steps in the preparation for breast-feeding during the last two months of pregnancy by proper care and hygiene of the breasts and nipples—a duty far too often carelessly done. The breasts should be washed daily, and the nipples brushed with a soft nail or tooth brush and withdrawn by gentle rolling and stretching. Applications to promote hardening are not really necessary. While recognizing that many antenatal classes are held, and many excellent books on mothercraft are available, none of these fulfil the function of the individual doctor to his patient. It is only by impressing his personality and knowledge on the mother, and by maintaining a personal contact, that the object may be achieved.

(*b*) *Preparation of the mother in the event of expected artificial feeding.*—There are some cases in which it can be foreseen that the mother is not going to be able to feed her child; for example, when she is suffering from pulmonary tuberculosis or severe heart disease. To prepare the mother before the strain of labour commences as to management of the baby's feeding is considerable ease to her mind, and the child will not be neglected in the worries of parturition. This problem may be solved to some extent by the presence of a nurse, but here again many nurses have their time occupied by the demands of the mother, and are only able to give a little attention to the child. This is no place for a discussion on the relative merits of artificial feeds, and it will suffice to say that the simpler the method the better. Cow's milk and water or a half-cream dried milk are the most satisfactory for early use. Sweetened condensed milks should be avoided.

(c) *To assist in the birth of a healthy child by correct maternal diet.*—Much attention has been paid to the necessity for a full and adequately balanced diet for the mother during her pregnancy. There are some articles of diet, however, which are of special significance to the developing fœtus and to the proper formation of breast milk. The three most important in this respect are: (1) vitamins; (2) iron; (3) calcium. (1) *Vitamins:* The mother should be advised to see that her diet is adequate in its vitamin content—milk, fresh butter, eggs, fresh fruit and green vegetables. It may sometimes be necessary to give a more concentrated form of vitamin, such as cod-liver oil (dr. i t.d.s.), marmite, or one of the many proprietary preparations available. This diet ensures a sufficiency of vitamin in the breast milk, and should, of course, be maintained after pregnancy. Rickets and other signs of avitaminosis are by no means unknown in breast-fed infants, and whereas the giving of vitamin D to the mother will not cure rickets in her child, an adequate supply taken during pregnancy and lactation will prevent its onset. Vitamin B is of value as a stimulus to lactation, as is also vitamin E (contained in lettuce and wheat embryo); the latter is said to contain a special lactation-promoting factor. (2) *Iron:* Helen Mackay,[2] in her work on nutritional anæmia in infancy, has drawn attention to the condition of hypochromic anæmia with a low hæmoglobin content, to which many infants—including breast-fed babies—are subject. This appears to be due primarily to an iron deficiency. She states "that a deficiency of iron in the diet of the pregnant mother, should it exist, would predispose to anæmia in the infant." Her statement has been supported by the interesting work of Parsons and his co-workers Neale and Hawksley,[3] who have presented clinical and experimental evidence to show that a hæmoglobin deficiency in the mother may lead to hypochromic anæmia in the infant, and that iron and yeast given during pregnancy will prevent this. Therefore, should a maternal anæmia with a hæmoglobin deficiency be present, the mother should be instructed to include iron-containing foods in her diet, such as spinnach and green vegetables. In the more severe cases Neale and Hawksley recommend ferri et ammon. cit. (gr. xx b.d.) and yeast (ʒ i daily). (3) *Calcium:* It is an interesting fact that the mother seems to have little power of retaining calcium at the expense of the fœtus, that is to say, she may show evidence of calcium deficiency herself—even to a degree of osteomalacia—while the fœtus will remain normal. After birth calcium is passed on to the child through the breast milk, and an adequate supply is essential for proper growth. The mother should therefore take at least one pint of milk a day during pregnancy and lactation. Milk is the best form of giving calcium.

(*d*) *Preparation and instruction of the mother in the general care of the baby.*—This is commonly done by the "granny"—well-meaning and experienced if not always safe—relative or friend. The practitioner should be able to take his part, but the plain truth is that few of us are conversant with such details as the proper way to wash napkins. It may be argued that this is the nurse's business, but if the medical adviser is to have control of his patient he should be able to guide the mother in the simple arts of child management. Antenatal information to the mother on such points as the number and character of stools, the best method of furnishing the cot, and the clothing of the infant will give greater confidence in the practitioner, and make for a happy, contented household in which to welcome the baby.

(*e*) *Preparation for the care of the infant in the event of expected premature birth.*—Premature birth is not always unexpected. Induction of labour is done with some frequency, and nephritis in the mother, to take one example, is a notorious inducer of premature labour. When therefore the doctor is in a position to expect the baby to be small and premature he should make corresponding arrangements. In the first place, he should impress on the mother the extreme importance of breast milk to the premature child, and if her health will permit, encourage her to feed her infant. Though it may not be always possible to put a premature baby to the breast, that does not mean the baby cannot have breast milk. The milk may be expressed and given by bottle or spoon. If the mother is encouraged to give the child what little milk she may have, it may make all the difference to the progress of her baby; and as soon as the child is able to be put to the breast and supply the sucking stimulus the milk will increase in quantity, and normal breast-feeding follow. Special bottles or pipettes, gamgee wool for clothing, and a warm, well-ventilated room may all be catered for and prepared in the antenatal time.

(*f*) *Preparation for the care of the infant in the event of expected disease.*—(1) *Syphilis :* In general it may be said that if a mother becomes infected with syphilis late in pregnancy or if anti-syphilitic treatment is commenced early in pregnancy, the child will be born with no gross stigmata of the disease, and probably with a negative Wassermann reaction. Nevertheless, it is wise, as Nabarro[4] rightly urges, for the infant to be given a course of anti-syphilitic treatment till the usual three negative reactions are obtained. If, on the other hand, the child is likely to be affected the mother should be warned of this, and especially urged to feed the child herself, and to have the baby treated adequately and early. It is not our purpose to discuss the anti-syphilitic measures to be given during pregnancy, or to the new born, but to stress the need and urgency for early antenatal treatment in the interests of the child. (2) *Tuberculosis:* If the mother is suffering from open pulmonary tuberculosis she should be advised that breast-feeding is definitely dangerous and should receive instruction in artificial feeding as previously described. Moreover, she should have explained to her that the risk of infecting her baby is not through her placental circulation, but by direct infection after birth. She should be instructed in the means to be adopted to reduce post-natal infection to a minimum, by avoiding breathing over, coughing over, kissing and fondling her infant. Babies are not infected through the breast milk, but through the handling and fondling it entails. In France many babies are immediately removed from a tuberculous household, but there is no corresponding scheme for doing so in this country, moreover, most mothers naturally object to the procedure; antenatal advice may thus be the means of preventing an early tuberculous death.

It is hoped that this article will draw the attention of doctors—general practitioners and obstetricians in particular—to the amount that can be done to prevent illness and to promote health in the new-born baby by simple instructions given to the mother with that object in view. If preventive medicine is to mean anything it must surely have its beginning in the infant.

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CARDIAC RHEUMATISM AND BATH TREATMENT

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THE cardiac lesions due to acute rheumatism are so conspicuous in their clinical symptoms that the Americans have recently come to regard them not as a complication but as a manifestation of rheumatism[1]. I would point out, however, that these cardiac disturbances can often be discovered only by means of an electrocardiogram, and fortunately depend in a large proportion of cases not on an organic lesion but only on a disorder of function which is often reversible. In this article it is proposed to discuss the extent to which rheumatic cardiac disturbances may benefit from treatment of the primary disease, rheumatism, on the analogy of syphilitic cardiac affections, in which treatment of the syphilis as the fundamental cause must be carried out even though a prolonged course may temporarily throw considerable demands on the heart.

Rheumatic disease is generally due to a virus which enters the body through some portal—generally the pharyngeal lymphatic ring—and reaches the joints by way of the blood stream. This virus, which has so far not been isolated, has a peculiar affinity, not only for the arthritic but for the other serous tissues. Thus one of the serous membranes may be attacked simultaneously with the joints—most frequently the endocardium. The order in which the various stages of an acute polyserositis generally occur are the following: (1) Infection of the portal of entry. (2) Infection of the joints. (3) Infection of other serous membranes, particularly the endocardium. In relapses—and rheumatism, in contrast to most other infective disorders, is particularly prone to relapse—the joint relapses tend to precede those of the heart. It seems likely, therefore, that the joint relapses tend to cause the cardiac relapses and not *vice versa.* It is, further, a matter of experience that the more successfully arthritic relapses are prevented, the less is the cardiac damage likely to progress. It is therefore very desirable to prevent as far as possible the recurrence of joint lesions which cause progressive cardiac damage.

The heart lesions which may occur in rheumatism are numerous. In the course of rheumatic fever, impairment of conductivity occurs in nearly 100 per cent. of cases; fortunately these are only transient results of generalized toxic damage (Fig. 1). Signs of general myocardial dysfunction are also often present (Fig. 2) as well as general acute and chronic myocarditis.

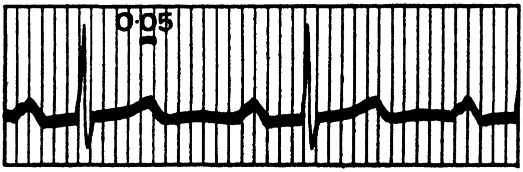

FIG. 1.—P-R interval prolonged by acute poly arthritis (0·27 sec.) P wave split.

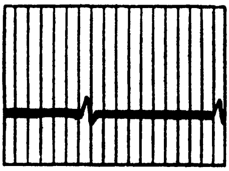

FIG. 2.—Electrocardiogram of a patient suffering from acute myocarditis. R wave very small (P wave impossible to analyse. T iso-electric).

The electrocardiogram facilitates early diagnosis and thorough analysis of heart muscle changes. Thus rheumatic myocardial lesions generally produce a change in the R wave, and splitting and irregularities are particularly frequent in the descending limb of the R wave (Figs. 3, 4, 5).

Rheumatic endocarditis generally takes the form of endocarditis verrucosa and often leads to permanent damage. The mitral valve is generally affected and mitral regurgitation or stenosis follows. In the etiology of pericarditis rheumatism is next in importance to

FIG. 3.—P–R interval 0·2 sec. T flat.

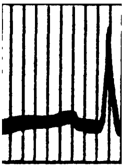

FIG. 4.—T negative.

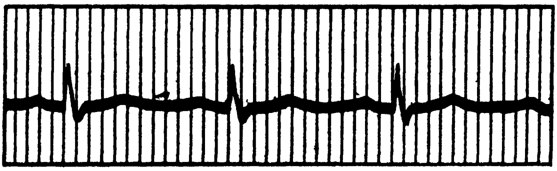

FIG. 5.—R notched. T notched.

Three cases with myocardial lesion. Descending limb of R wave notched.

tuberculosis. It should be noted that the electrocardiogram often shows a large Q. iii, though this is not invariably present (Fig. 6). In a case of rheumatic

Fig. 6.—Large Q iii wave in rheumatic pericarditis (arrhythmia).

polyarthritis all the components of the heart may suffer simultaneously instead of conferring immunity. An attack of acute polyarthritis sensitizes the patient to relapses; these two facts make the prognosis in general unfavourable. It is therefore important in prognosis to remember that cardiac rheumatism is never a pathological "state," but rather a "process" with a progressive tendency.

In the complex of rheumatic problems so many points still remain doubtful—the pathogenesis, hypothetical virus, the cause of relapse—that it is unfortunately hardly possible as yet to discuss effective prophylaxis. Fortunately, however, we are able to ameliorate the condition of rheumatic patients, to prevent recurrences in many cases, and frequently to produce a complete cure even without elucidating the pathogenesis of the condition entirely. We have in sodium salicylate, pyramidon and trypaflavin specific remedies in acute polyarthritis which not only generally have a beneficial effect on the condition of the joints but also on that of the heart. How these remedies should be used in any particular case is beyond the scope of the present article. It must, however, be emphasized that the greater care is taken of the patient during convalescence, the later he is allowed to leave his bed and resume physical work, the more likely is it that the condition will subside without permanent damage. The fate of many a joint is sealed when it is exposed to weight bearing or strain while the local temperature is still raised and the body temperature sub-febrile. The flabby condition of the heart after high pyrexia also renders it unfit to bear much strain. As soon as acute symptoms have subsided a course of thermal treatment is indicated, constituting, as centuries of experience at well-known spas have shown, the best guarantee of a complete cure and the prevention of relapses. Though all the details of the mode of action of baths have not yet been elucidated it is certain that they initiate a series of biological processes in the organism and thereby effect a more or less complete " detoxication."[3] This action is not merely transient and symptomatic, but in most cases permanent in its effects. Balneotherapy, among the numerous methods available for treating rheumatism, approximates most closely to the aim of etiological therapy.[4] As pointed out previously, if it is possible to prevent relapses in the joints the cardiac condition likewise ceases to progress. For this reason the erroneous belief, that thermal treatment of the joints is damaging to the heart is very deplorable. The radical treatment of rheumatism and the prevention of relapses is thus, from the aspect of the otherwise progressive rheumatic cardiac lesion, really a form of etiological treatment, or at any rate, useful prophylaxis.

Numerous points have to be considered in the thermal treatment of a rheumatic patient who is likewise suffering from an affection of the heart. Patients with an acute cardiac condition are unsuitable for thermal treatment, as are those suffering from acute polyarthritis. That patients with failure of compensation should be put to bed and not into a bath is obvious. Though thermal treatment is generally contra-indicated in cases of persistent hyperpiesis, we have never had to regret a careful thermal cure when otherwise indicated. In fact, we have often seen that after hot mud applications the raised blood-pressure falls not merely temporarily but for some considerable time. This fact, which has hitherto hardly been recognized, may be ascribed to the dilatation of the peripheral capillaries which follows better distribution of the blood; the "peripheral heart" takes on a part of the work of the " central heart." Cold and livid extremities are frequent in rheumatic patients as a result of spastic contraction of the arterioles and capillaries, and these also benefit markedly from thermal treatment. Patients with well compensated cardiac lesions are in general suitable for careful thermal treatment. They generally stand the treatment as well as patients with sound hearts. There is, however, no reason why patients with recompensated lesions should be absolutely debarred from a thermal cure. If the treatment is carried out with due care and skill (local mud applications instead of whole baths and frequent rest days) not only is the heart not damaged, but it is, on the contrary, benefited by the prevention of relapses.

Accurate dosage is as important in thermal treatment as in other forms of therapy, which also only produce satisfactory results with suitable dosage and may otherwise do harm. Treatment should be prescribed only when the heart function has been carefully tested and accurate information obtained of possible relative insufficiency. In addition to the usual mechanical tolerance tests, basal metabolism gives accurate information. Patients with latent failure of compensation require more oxygen than those with well-compensated hearts or healthy hearts. As heat tolerance varies considerably in individual patients it is important to form a definite opinion on this point before starting treatment and to check the conclusions several times during the course of treatment. According to von Bergmann, the discovery of so-called " latent hyperpiesis " is very important; the most important diagnostic sign of this is the " inverse vascular reaction."[5]

Electrocardiograms and orthodiagrams taken before and after a suitably planned course of thermal treatment do not indicate that the heart has in any way been damaged. Even in patients with severe myocardial lesions (e.g. bundle-branch block) it was possible to carry out local thermal treatment without damaging the heart. The following very instructive case shows how unwise it is to be too dogmatic about " hearts " and " bath treatment," and to forbid thermal treatment off-hand to every patient who shows even a very pathological electrocardiogram (reproduced in Fig. 7). The electrocardiogram according to the prevailing clinical interpretation indicates a very bad prognosis with a probable total termination in a few

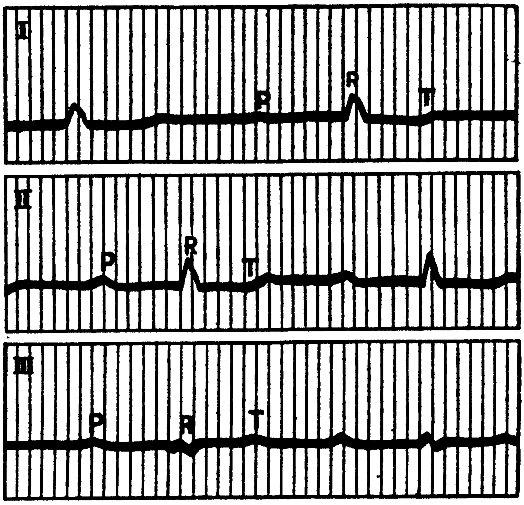

FIG. 7.—Bundle-branch block in chronic polyarthritis. The patient stood the bath treatment well and without any disturbance. The joints showed well-marked improvement after treatment. (T I, II, negative. P-R interval 0·35 sec. Clinical diagnosis: Rheumatic mitral regurgitation. Myocardial degeneration).

years. The brief clinical history is as follows :—

H.W., aged 63 years, had an acute polyarthritis thirty years ago, with numerous recurrences since that time. Was practically never free from symptoms during the last ten years. Increasing deformity of the fingers and both knees. For the last three years had been hardly able to stand and unable to walk because of severe pain in both knees and left ankle. Temperature 99°—99·3° F. For fifteen years increasing cardiac disability, occasional slight failure of compensation. When first seen the heart was fully compensated for the ordinary activities of daily life (this was probably due to the fact that the condition of the joints only permitted of a limited amount of physical exercise). Condition on examination : Joints of both hands and of both knees deformed; cracking and very painful on movement. Heart enlarged both sides, heart sounds faint. Blood pressure $\frac{110}{90}$. Electrocardiogram : degeneration of myocardium. Treatment : local mud applications three times a week for 2½ months. Throughout the stay in the clinic continuous administration of digitalis. Ultimately this man who had been treated by all kinds of physical methods in vain was almost entirely freed of pain. The electrocardiogram taken after the course of treatment showed no change. The compensation remained good in spite of the fact that he was able to undertake much more exercise after the cure than before. A patient with advanced vascular disease was thus freed from severe joint pains and enabled to move much more freely without damaging his heart. Fourteen months after the cure the patient's condition was in all respects satisfactory.

The moderate degree of tachycardia which occurs during thermal treatment is a physiological process and is a direct consequence of the rise in temperature which results from the baths. It is merely a simple sinus tachycardia such as naturally follows any physical exertion, is proportional to the work done, and gradually subsides to normal as soon as the cause ceases. The "bath tachycardia" never reaches the so-called "critical frequency." The increase in the pulse rate is accompanied by increased activity of all the protective mechanisms of the heart. Tiring bath treatments do no more and no less harm than other forms of exercise in inappropriate doses. Thermal treatment of the locomotor apparatus certainly has no specific ill-effect on the heart.

Conclusion.—The rule that intensive thermal treatment should always be forbidden to cardiac patients needs complete revision, otherwise a large group of rheumatic patients will be debarred from the possibility of cure. As suitable thermal treatment will diminish the frequency of relapses of the joint symptoms (which in turn may lead to cardiac relapses) the heart is indirectly benefited by radical thermal treatment. Thermal treatment carried out at the right time in suitable doses is not only not harmful, but leads simultaneously to improvement in the rheumatic symptoms and in the general condition of the patient, as well as to alleviation of subjective cardiac symptoms, which run parallel to a stabilization or even an improvement in the objective state of the heart.

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THE TREATMENT OF DISEASE OF THE TIBIA

BY ERNEST F. NEVE, M.D., F.R.C.S.
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BONE disease is extraordinarily common in Kashmir. During the 46 years of my period of service 6,600 operations have been performed for disease of the long bones of the lower extremity; and of these about 90 per cent. were for disease of the tibia. The commonest affection was *syphilitic osteitis*. Its recognition is quite simple, and it responds to specific treatment. But if, as is usually the case, there is pain, surgery can give relief. Lister's practice was to trench the bone. A simple and effectual procedure is to make a two-inch incision over the most prominent part of the swelling, down to the bone, and then, with a (preferably electric driven) saw cut down vertically to, but not right into, the medullary cavity. The wound is then closed and heals by first intention. There is usually definite relief from pain. 2,500 operations were done for this condition alone. *Tuberculous disease* is more apt to attack the articular ends and is too often associated with tuberculous arthritis. If the region of the epiphysis alone is involved early, careful aseptic drainage and heliotherapy may avert joint disease and arrest further extension of the lesion.

Osteomyelitis in my experience is vastly more common, and is a most serious affection because of the systemic infection and toxic absorption. In the more acute and extensive cases, not only is the medullary cavity affected, but one or both epiphyses are involved and the knee or ankle may become implicated. Prevention of extension is possible if early steps are taken for complete drainage. Incomplete operations are too common. If, as is often the case, the whole shaft and both epiphyses are involved, it is best to lay the bone open from epiphysis to epiphysis, clean out the medullary tissue and see that there is free drainage from each end of the cavity.

Acute necrosis after exanthemata may follow measles or, rarely, enteric fever, and is not uncommon after small-pox in infants. It usually affects the radius or ulna and much less frequently the tibia. It is similar in its character to idiopathic acute necrosis, which is also not rare. When quite separate it is tempting to remove the whole of the necrosed shaft. Formerly this was carried out; but owing to the difficulty in preventing contraction and shortening of the newly formed shaft, it was found that better results were often obtained by opening the medullary cavity, eviscerating, and then cutting away the internal and external surfaces of the tibia but leaving the posterior surface to act as an intra-periosteal splint. If there are posterior adhesions, portions may recover. Otherwise, when sufficient regeneration of bone has occurred, the sequestrated fragment may be removed.

Splintery necrosis is a common condition; the bone is expanded with osteitis and, scattered about throughout the shaft, small sharp-pointed sequestra are found. In such cases the medullary cavity may be almost obliterated. X-rays facilitate the location of such sequestra. *Exfoliating necrosis* and *incarcerated sequestra* with much enlargement of the bone and cloacæ are common enough. Necrosis of the posterior surface of the bone is uncommon.

In splintery necrosis it is essential to cut away the front of the tibia and the anterior edges of the inner and outer surfaces with a sharp chisel and bone forceps angled on the flat or small sequestra will escape discovery. The edges of the skin can then be brought together and union by first intention be secured. In this way several weeks may be saved in treatment and an extensive ugly depression with a thin, universally adherent cicatrix may be avoided.

RECENT ADVANCES IN THERAPEUTICS

THE TREATMENT OF CHOREA BY INDUCED PYREXIA

The accepted treatment of Sydenham's chorea may be summed up in the word—rest, especially as the heart is involved in approximately 50 per cent. of cases. In 1931, however, Lucy Porter Sutton (*Journal of the American Medical Association*, 1931, xcvii, 299) suggested that instead of expectant treatment active measures should be taken to cut short an attack of chorea, and she recommended the induction of artificial pyrexia by T.A.B. vaccine, having observed that an intoxication with fever resulting from phenobarbital therapy, when occurring in a case of chorea, caused a reduction in the choreic manifestations. She stated that by producing a temperature of 103° to 106° F. each day for seven to ten days the choreic movements could be brought to an abrupt conclusion and the child could be allowed up about two weeks after the commencement of treatment. In June, 1933, Donald Bateman (*British Medical Journal*, 1933, i, 1003) published a detailed report on this method of treatment, which he had studied at Bellevue Hospital, New York, under the direction of Dr. Sutton, and where, he stated, the method of induction of fever is now used as a routine procedure in the treatment of chorea. More recently, J. W. Cheetham (*British Medical Journal*, November 4, 1933, ii, 815) and Huxley Fish in another article in the same issue (p. 816) have published cases treated by this method. Cheetham points out that there is a very important part of the clinical picture, namely, the cardiac complications, upon which the effect of the treatment must be observed before any conclusion can be drawn as to the efficacy of the method. It might reasonably be supposed that a constitutional disturbance such as is produced by this treatment might have an adverse effect upon the heart. In a series of cases which he studied he came to the conclusions that the treatment of chorea by artificial pyrexia shortens the duration of choreic movements, does not prevent recurrence, and appears to have no beneficial action on rheumatic carditis. He points out that a grave danger lies in the tendency to produce a false impression of cure by abolishing the movements, which in themselves are merely a symptom, when serious changes may be occurring in the heart. It is undesirable, therefore, to allow a child out of bed two weeks after the onset of an attack of chorea unless it can be conclusively proved that the treatment which cuts short the choreic movements also cuts short any accompanying carditis. Huxley Fish, who records a case successfully treated by this method, suggests that in our present state of ignorance of the pathology of rheumatic carditis and its relation to chorea, the practice, described by Bateman, of discharging cases of chorea after three weeks in hospital would seem to involve considerable risk. On the other hand, if these cases are to be kept recumbent for a long time after the movements have ceased the value of the treatment seems doubtful.

THE VALUE OF SODIUM MORRHUATE IN THE INJECTION TREATMENT OF VARICOSE VEINS

Interest in the injection treatment of varicose veins by sodium morrhuate was stimulated by the article published in 1930 by T. T. Higgins and P. B. Kittel (*Lancet*, 1930, i, 68) and H. Biegeleisen (*Surgery, Gynæcology and Obstetrics*, November, 1933, lvii, 696) has just published a critical review of this method, based on a detailed study of 561 injections—altogether 1,000 injections were given, but all of these were not tabulated. Sodium morrhuate is an unknown, relatively unstable mixture of sodium salts of the unsaturated fatty acids found in cod-liver oil. Four preparations of sodium morrhuate were considered: one, a 5 per cent. solution, without any addition, and the other three preparations had the addition of ½ per cent. phenol or 5 per cent. benzyl alcohol. The author points out that there is a diversity of opinion as to whether an antiseptic is necessary to keep the solution sterile. It has been shown, however, that pure unadulterated sodium morrhuate is the better preparation therapeutically, and that if it can be prepared in a sterile manner without the use of antiseptics this method should be encouraged. But more study of this problem is necessary. Biegeleisen comes to the following conclusions:—The disadvantages of sodium morrhuate are: (1) it is not of uniform chemical composition; (2) it is not uniform in its therapeutic action; (3) it is not completely stable in solution; (4) its potency diminishes with age; (5) the use of local anæsthetics in the mixture is unnecessary and unadvisable; (6) it is capable of slough formation on perivascular injection; (7) there is some question whether or not it can be prepared aseptically without the use of antiseptics. The advantages of sodium morrhuate are: (1) non-toxicity in therapeutic amounts; (2) a relatively small percentage of sloughs follow its use; (3) little local pain. These conclusions apparently point unfavourably toward the continued use of sodium morrhuate in its present form. Yet, curiously enough, the author is of the opinion that from this haphazard mixture an ideal solution can be developed. This can only be done by the isolation in pure form of the active ingredients in the combination. The author has begun this task, but much more work remains to be completed.

THE ANTI-RACHITIC ACTIVITY OF CALCIFEROL

Calciferol is the name given by workers in England to the pure vitamin D in crystalline form, which was isolated simultaneously by workers in Germany who gave it the name of "vitamin D_2." J. C. Spence, of Newcastle-on-Tyne, has recently published (*Lancet*, October 21, 1933, ii, 911) the results of clinical trials of calciferol which were carried out under the auspices of the Therapeutic Trials Committee of the Medical Research Council with a view to ascertaining the therapeutic action of the pure vitamin D in the treatment of human rickets. The calciferol employed was supplied by the British Drug Houses, Ltd., who market it as " radiostol," an oil solution containing 7·5 mg. of pure crystalline calciferol per 100 c.cm., equal to 3,000 units per c.cm. Twelve actively rachitic children were treated with daily doses of calciferol for eleven weeks or more. The therapeutic effects were estimated by serial radiograms, comparing them with a standard scale of the optimal rate of cure. A control of eight rachitic children without calciferol was used to determine what spontaneous or automatic healing might have occurred had no calciferol been given. The results in these twelve cases showed that calciferol had an active curative effect on the rickets, and that it produced healing at an optimal rate, acting as quickly and effectively as the usual therapeutic doses of cod-liver oil or irradiated ergosterol. The results of the antirachitic activity of calciferol were confirmed by observations on two pairs of twins, one member of each being kept as control, and also on a child with an exactly controlled diet. It was found that 2 c.cm. of calciferol solution daily had a definite curative effect on the rickets of a child living on a vitamin D deficient diet, but it was not possible in this investigation to make an exact quantitative comparison between the therapeutic activity of calciferol and that of other vitamin D preparations, because daily doses of less than 1 c.cm. of the calciferol solution (3,000 units) were not given.

THE SERUM TREATMENT OF CANCER

H. J. Wolff and W. C. Alvarez publish (*Proceedings of the Staff Meetings of the Mayo Clinic*, October 18, 1933, viii, 634) an interesting review of the work of T. W. Lumsden in the Cancer Research Laboratories of the London Hospital. The interest of W. J. Mayo had been aroused during a recent visit to England in the work of Lumsden, and Wolff and Alvarez have reviewed this work in the light of Lumsden's published communications. The evidence accumulated seems to show that in order to secure an efficient serum against any type of cancer, the cells of this cancer must first be made to grow in a species of animal other than the one in which the disease is to be treated; the cells are only slightly susceptible to antibodies produced in the animal in which they grow but they are highly susceptible to such antibodies produced in an animal of another species. Other experiments led Lumsden to believe that it will be hard to obtain good results with anti-cancer serums as long as they are so promptly diluted in the blood and the tissues of the body. In order to restrict this scattering, he injected epinephrine around the tumours in rats, and then, with the circulation slowed, he was able, with injections of antiserum, to effect cures in about 48 per cent. of the animals. Epinephrine alone appeared to have some effect because it produced cures in about 20 per cent. of the animals. Unfortunately, in many instances, barely sublethal doses of cancer antiserum had little, if any, effect on the tumours, and efforts had to be made to concentrate it. It was found that the part of the antiserum which has a special affinity for cancer cells is destroyed by heating to 56° C. for from six to eight hours. A second factor, lethal for normal as well as for malignant cells of individuals of the same species of animals from which the carcinoma used as antigen is taken, is stabile and heat resistant. A third antibody present even in non-immunized animals is destructive to all the cells of animals of other species. The anti-cancer substance was found to be confined almost exclusively to the euglobulin fraction of the serum while the anti-species substances were found in the pseudoglobulin fraction. Unfortunately, the euglobulin fraction is highly labile, and must be prepared shortly before it is to be used. When concentrated ten times and redissolved, it was found to be relatively non-toxic to normal cells, and, as was hoped, its destructive effects on cancer cells were greatly strengthened. Some of this concentrated euglobulin was injected as a thick emulsion into and around the breast cancers which arise spontaneously in about 90 per cent. of the females of the Simpson strain of mice, and in the seven animals treated, the disease was cured. The presence of a considerable degree of immunity was shown by the fact that when in forty cancerous mice treated with the antiserum, the tumour was excised and a piece transplanted to another part of the same animal, this "autoplast" failed to grow. In forty control mice similarly treated, but with the euglobulin made from normal serum, thirty-nine succumbed. The work, then, is encouraging, and cures have been effected in a number of mice afflicted with cancer. The next thing that must be done is to see if similar serums can be made to destroy cancer in men and women. Lumsden begs practitioners and patients not to descend on him with requests for the serum because he is not yet ready to attempt treatment on a large scale. He wishes first to treat a few patients who have been chosen by him as particularly suitable for the first experiments.

A METHOD OF TAKING RAW LIVER

Although the efficacy of liver treatment in pernicious anæmia (and, indeed, in other debilitating illnesses) is established, the difficulty still remains of persuading a patient to eat enough raw or half-cooked liver. In order to overcome this difficulty various liver extracts have been prepared and are upon the market, but some authorities maintain that the liver itself is more potent than the extract. Louis Desclaux has put forward (*Journal des Practiciens*, October 14, 1933, xlvii, 665) a simple method of taking raw liver which he has found effective in pernicious anæmia and also in pulmonary tuberculosis. Raw calf's liver is minced finely and rolled into little balls, which are dipped in grated breadcrust and swallowed without being masticated. This can be taken along with a vegetable soup or during the course of a meal, and none of the author's patients have made any objection to swallowing up to 300 grams daily of calf's liver in this way.

PRACTICAL NOTES

THE TREATMENT OF INFECTIOUS WARTS

I have noted with interest the annotation by Dr. Melhuish with reference to the treatment of infectious warts on the soles of the feet of children in THE PRACTITIONER (July, 1933, cxxxi, 113). I was particularly interested as one of my children had contracted this infection at school. However, instead of a general anæsthetic and the application of the electric cautery as recommended, she was treated with a single application of X-rays by one of my radiological colleagues at the Westminster Hospital in the middle of September, with the result that the multiple warts had entirely disappeared by the beginning of November. As a detached observer, completely ignorant of both dermatology and radiology, I believe this observation may be of service to some of your readers.

A. F. MACCALLAN, C.B.E., M.D., F.R.C.S.

THE TREATMENT OF EPISTAXIS

One of the commonest emergencies a general practitioner has to face is that of epistaxis and I have rarely found the following method fail when it has been possible to see the bleeding vessel. A "cherry stick" or some similar wooden probe is dipped into a bottle containing chromic acid crystals, and a crystal will then readily adhere to the end of the stick. A clear view of the bleeding vessel should then be obtained and with a piece of ribbon gauze or cotton wool the blood should be wiped away and then the chromic acid crystals applied immediately with firm pressure for half a minute over the offending vessel. If one application is not sufficient to form a protective scab, a second should be made. If this form of treatment fails, a handy form of cauterizer is a knitting needle: this can be brought to a dull red heat over the flame of a "meta" solid brick of methylated spirit. Very few cases of epistaxis cannot be cured by one of these two methods.

A. H. DUNKERLEY, M.R.C.S., L.R.C.P.

THE DISPLACEMENT TREATMENT OF NASAL SINUSITIS

The displacement method of Proetz for the treatment of nasal sinusitis, described by Mr. Scott Stevenson (THE PRACTITIONER, October, 1933, cxxxi, 495) is a method particularly adapted for use in general practice, with one modification which I should like to mention. There must be few general practitioners who have a suitable suction apparatus for negative pressure, as was described in the technique of the method, but I have found an ordinary Politzer bag quite adequate for inducing negative pressure if the air is squeezed out of the bag before applying it to the nostril.

ALASTAIR MACLEOD, M.B., Ch.B.

REVIEWS OF BOOKS

Recent Advances in Endocrinology. By A. T. CAMERON, M.A., D.Sc. London: J. and A. Churchill, 1933. Pp. vii and 365. Plates 2; figs. 54. Price 15s.

THE author, who is professor of biochemistry in the University of Manitoba and joint author of *The Biochemistry of Medicine* (1933) in Messrs. Churchill's Empire Series, has worked on the biochemical aspects, for example, of thyroxine, of the endocrine glands, and much of the scientific knowledge of this much-discussed subject is of biochemical origin. The enormous amount of investigation, the numerous recent advances, and the inevitable hypotheses in connection with the glands of internal secretion have produced a position of such uncertainty in the minds of the ordinary reader that an interim report on a rapidly changing horizon is much needed, and this, difficult as it is, Professor Cameron has successfully provided in nine chapters and in proper proportion. Thus 88 pages are devoted to the thyroid and iodine metabolism, 59 to both the pituitary and to the gonads, 46 to the adrenals, 44 to insulin, 35 to the parathyroids, and 15 to the subject of the endocrine interrelationships. The chapter headed "Some Actual and Presumptive Endocrine Principles" deals with secretin and with the pineal body and the thymus. The author definitely condemns the old opinion that the endocrine glands exert any detoxicating effect, and lays it down that the endocrine glands may produce pathological states by deficient or by excessive secretion, but not by an abnormal secretion. Each chapter has a select bibliography, that of the thyroid gland containing 275 references.

Maternal Mortality and Morbidity: A study of their Problems. By J. MUNRO KERR, M.D., F.R.F.P.S., F.C.O.G. Edinburgh: E. and S. Livingstone, 1933. Pp. 400. Illustrated. Price 25s.

NO medical subject has occupied more space in the lay as well as the medical Press during the last few years as has that of maternal mortality. Mortality figures show great improvement in every branch with the exception of this one, and the discussions in many sections of the Press have degenerated into a mere wrangle as to which part of the community is to blame for the present state of affairs. Of the numerous conditions leading to a fatal issue sepsis is the most important. So much has been written upon this that in many minds maternal mortality is merely another term for sepsis, and the author of this book has done a great service by bringing forward such a well-considered dissertation upon the whole subject. This book is divided into four separate parts, each with several chapters. The first reviews the "Causes of Maternal Mortality"; the second and perhaps the most important section deals with "Prevention" and shows what improvements have been achieved with the increased amount of antenatal care—but much more has still to be accomplished in this direction. Then come several chapters on the "Services" and one on "Organization." This last is a subject to which the author has given much thought for many years and about which he holds very definite views. These are expressed clearly and, while on some points other authorities will differ from him, these are minor ones, and there is no doubt that the views expressed and the scheme suggested form a definite basis upon which a full maternity service could be instituted. The book is full of statistics and it will be impossible for anyone in the future to write anything upon this subject without reference to it, and for some time it must be the standard authority, but in spite of the amount of detailed information which it contains it is not dull and holds the reader's interest all the time. This book can be strongly recommended to all who are interested in this subject—and what medical man is not?—and it is one which must be in the hands of all who are giving any special study to the subject or who require reference to any part of it. This book could have been written only by a man of wide intelligence who has devoted many years to reading and quiet communing on this matter and so can take a wide survey of the whole subject.

The Queen Charlotte's Textbook of Obstetrics. By THE HONORARY STAFF OF THE HOSPITAL. Third Edition. London: J. and A. Churchill, 1933. Pp. 654. Illustrations 305. Price 18s.

THE latest edition of this work is a decided improvement on its predecessors and can be recommended to students about to take the qualifying examinations and to practitioners as a work for practical reference. Like all books of composite authorship it suffers in that many facts are repeated in different chapters, thus obtaining an undue prominence and tending to obscure points of greater practical import. The illustrations are clear and concise, the print good, but there are several small points and errors of spelling which have escaped the proof reader's eye. The major part of the book gives sound, practical advice, the chapters on the puerperium and posterior positions of the occiput being particularly good, but there are a few notable exceptions. Opposite the page dealing with the treatment of "white asphyxia" are illustrations of that criminal manœuvre "Byrd's artificial respiration," a barbarous procedure which should have long ago been buried. Tapping the excess of liquor via the abdominal wall is advised in cases of hydramnios, a method which can rarely, if ever, justify the risks entailed. The chapter dealing with abortions is not up to the standard of the rest of the book. Up to 16 weeks gestation it advises dilatation of the cervix and removal of the ovum, a statement easily put on paper and equally difficult and dangerous to perform. Similarly, in cases of septic abortion one is told to clear out the uterus with the gloved finger and ovum forceps: no mention is made of uterine drainage by glycerine, nor of the dangers of local interference in the presence of sepsis; in fact the advice given is to "scrub" the uterine wall with a gauze mop! In spite of these adverse criticisms, however, the book is worthy of its title, which is saying a great deal.

The Clinical Study and Treatment of Sick Children. By JOHN THOMSON, M.D., LL.D., F.R.C.P. Fifth Edition. Rewritten and enlarged by LEONARD FINDLAY, M.D., D.Sc., M.R.C.P., F.R.F.P.S.G. Edinburgh and London: Oliver and Boyd. Pp. 1075. Illustrations 344. Price 30s.

THE new edition of Dr. Thomson's well-known textbook has been very extensively revised by the senior author's former pupil, Dr. Findlay, and the result is one of which the medical schools of both Edinburgh and Glasgow can feel proud. As was previously the case, the book is still characterized by the singular clarity and distinction of the clinical descriptions, but to these have been added in many instances a much fuller consideration of the biochemical and pathological factors than could previously have been given. Of the more recent additions, the sections concerned with respiratory disease and with spasmophilia are perhaps those of outstanding interest. Dr. Findlay has been successful in preserving a unity that is often looked for in vain in textbooks of multiple authorship, and if a rather harshly dogmatic note has occasionally crept in, it is not sufficiently obtrusive to interfere with the harmony of the whole. The volume is extensively documented and excellently illustrated. It provides one of the best one-volume textbooks of pædiatrics at present available.

A Textbook of the Practice of Medicine. By various authors. Edited by F. W. PRICE, M.D. Fourth edition. Oxford Medical Publications. London: Humphrey Milford, 1933. Pp. xlv and 1,995. Figs. 106. Price 36s.

PRICE'S *Medicine*, which first appeared in 1922, has now an established position, and in spite of the inevitable tendency for new editions to increase in length with the inclusion of new material, has stood this test well; for whereas the original volume numbered 1,753 pages and had 95 figures, the present edition is still under the two thousand pages mark. This must be ascribed to careful revision, the frequency with which articles have been wholly or in part re-written, and to much editorial supervision. The number of changes in the present edition as set out in the preface is remarkable. Another matter for congratulation is the skill and foresight with which the original contributors were chosen, for the changes necessary have been comparatively few, thus suggesting that the selection was made not only on past achievements, but on a shrewd estimate of the future. In the first edition there were 26 contributors, now the list gives 27; some valued senior names have dropped out, and in this volume Dr. L. J. Witts has written a thoroughly up-to-date account of the diseases of the blood, and Dr. N. Hamilton Fairley has joined his colleague Dr. Carmichael Low in the articles on tropical diseases. The articles of Dr. Arthur Hurst on disorders of the digestive tract and of Drs. Collier and Adie on those of the nervous system are as clear and authoritative as ever. The pages, necessarily thin in order to diminish undue weight, are free from any tendency to stick together. The editor's hope expressed in the first edition that this work would reflect credit on the teaching of medicine in London, which was soon realized, is worthily maintained.

An Introduction to the Study of the Nervous System. By E. E. HEWER, D.Sc., and G. M. SANDES, M.B., B.S., F.R.C.S. Second Edition. London: William Heinemann (Medical Books), Ltd., 1933. Pp. xiv and 147. Diagrams 65. Price 21s.

THE issue of a second edition of this book within four years is an indication that it has fulfilled its purpose, which was to provide an elementary volume on the histo-anatomy and physiology of the nervous system whereby students could obtain a sound grounding on this most difficult of subjects. In the new edition recent additions to our knowledge of the structure and functions of the corpus striatum and new matter relating to the cerebellum and the autonomic system have been included, while new sections have been added on the neuroglia and the cerebro-spinal blood vessels. Two helpful tables have also been inserted, one giving the various components of the cranial nerves, the other the autonomic nerve supply of certain structures so far as it is at present known. The illustrations are clear and serviceably diagramatic. Well-chosen references at the end of each chapter are an invitation to the student to continue his or her study of the nervous system. The emphasis which is laid on the clinical application of neuro-anatomy and physiology will doubtless stimulate many students to interest in clinical neurology.

Wilhelm Conrad Röntgen and the early History of the Roentgen Rays. By OTTO GLASSER. London: John Bale, Sons and Danielsson, Ltd., 1933. Pp. xii and 494. Illustrations 97. Price 32s. 6d.

THE author, now attached to the Cleveland Clinic Foundation, dedicates to Drs. G. W. Crile and W. E. Lower the English translation of this volume which he originally wrote in German. The story of the discovery of " a new kind of rays " on Friday, November 8, 1895, by W. Conrad Röntgen, then of Würzburg and fifty years of age, is first told. It occurred late in the evening when no one else was in the laboratory, and his two assistants did not know anything about it until the end of December, the interval having been a period of intensive work at high nervous pressure by their chief, who kept a striking silence about the nature of his research. On December 28 he handed in his manuscript which was published at once and excited interest, research and confirmation all over the civilized world; Röntgen lectured at Würzburg on January 23, 1896, and four days later Sir J. J. Thomson showed radiograms before the Philosophical Society at Cambridge. Rarely has a great discovery been so rapidly recognized, and the author of this volume appends a list of more than a thousand papers on this subject which were published during 1896. A chapter devoted to first impressions of the news of Röntgen's discovery contains not only statements by his peers in physical laboratories, but also the reactions of the lay and comic Press. Among the early radiograms reproduced is one of the hand of Frau Röntgen taken on December 22, 1895. About a sixth of the volume is occupied by the personal reminiscences of Röntgen, contributed by Fraulein Margret Boveri, a close friend; it shows him as a simple, straight and shy soul, who firmly declined the honour of being ennobled. Further chapters dealing with claims for priority in Röntgen's discovery, with the medical applications in diagnosis and treatment, and with various later developments in connection with X-rays, make this a very complete as well as interesting record of a great man of science.

The Physician's Art: An Attempt to Expand John Locke's Fragment "De Arte Medica." By ALEXANDER GEORGE GIBSON. Oxford, at the Clarendon Press. London: Humphrey Milford, 1933. Pp. 237. Price 7s. 6d.

IN 1669 John Locke, a senior student of Christ Church, Oxford, and a friend of Sydenham, wrote a little known tract *De Arte Medica*, in which he formulated the guiding principles he had in vain sought to learn when he first engaged in practice. It appears that this fragment was to be part of a large work—an historical criticism of "the Faculty of Medicine as it now stands in reference to diseases and their cure"—which was never written; this is a cause for deep regret, for the author of the "Essay concerning the humane Understanding" would surely have done an enormous service for Medicine by establishing a correct system for its practice. Dr. Gibson, also educated at Christ Church, appropriately prints Locke's essay, and then dutifully expands it in the light of these modern days. The art, especially as practised in Britain, of medicine is pleasantly reviewed with wisdom and much thought, and no doubt based in part on his close association with Sir William Osler. Successive chapters deal with art and science, diagnosis, prognosis, treatment, the ethics and management of practice, of the doctor himself, and optimism. Written by an experienced teacher with high ideals, this is a guide to practice, not necessarily of opulence but of a much higher type.

Legal Aspects of Mental Illness: Procedure. By W. H. GATTIE. Third Edition. London: Shaw and Sons, 1933. Pp. 88. Price 7s. 6d.

THIS authoritative account of the legal procedure has been practically rewritten, and its former title "Lunacy Practice, Certification and Detention" has been superseded, as the result of recent legislation and the change in nomenclature. It now incorporates the practice under the Lunacy and Mental Treatment Acts, 1890–1930, and contains an additional chapter on testamentary capacity and the appointment of a Receiver for the estate of a person suffering from a mental illness likely to be of long duration. The appendix reproduces the Mental Treatment Act, 1930, which contains the important regulations about voluntary patients. The volume, which practitioners would do well to have at hand for their guidance, does not contain the Mental Deficiency Acts.

ERRATUM

In the article on "The Toxic Idiopathies," by Dr. John Freeman, in the last number of THE PRACTITIONER (November, 1933, cxxxi, 546), a mistake was made in the order of printing. The last line on page 567 and the whole of page 568 were printed out of place; they have been taken from the end of the section on Metabolic Abnormality and should appear in the middle of page 550 immediately before the section on Serological Abnormalities. The article should therefore end at the bottom of page 567 with the words "the toxic idiopathies have a complicated causal mechanism."

NOTES AND PREPARATIONS

DROITWICH SPA

We have already pointed out (THE PRACTITIONER, 1932, cxxix, 302) the great possibilities of Droitwich as a spa for the treatment of rheumatism, for its saline waters have qualities unique in Europe, being ten times denser than ordinary sea water and considerably more salt than the Dead Sea. An extension was recently opened to the St. Andrew's Brine Baths, which not long ago were remodelled and rebuilt, bringing the facilities at Droitwich into line with those at the larger European spas, and showing that the Hesketh Estates, Ltd., who control the spa, are alive to recent developments in balneology. The newest reclining bathrooms are fitted throughout with vitrolite in teak panelling, and the general appointments throughout the new sections are of the high standard which modern requirements demand. All forms of treatment at Droitwich provide essentially for the concentrated application of the potent saline waters, and the practitioners in the town, some of whom have been making an intensive study of spa treatment abroad, devote special attention to the brine treatment. Although Droitwich is only a little town in Worcestershire it has excellent hotels for the accommodation of the patients who come for treatment.

SARIDONE ANALGESIC TABLETS

Saridone analgesic tablets are a new preparation made in England by the Hoffmann-La Roche Chemical Works, Ltd. (51 Bowes Road, London, N.13). The preparation is issued in the form of five-grain tablets which disintegrate very quickly in cold or hot water and each of which contains the following :—

Phenyldimethylisopropylpyrazolon - - -	gr. 1¾
Acetphenetidin (phenacetin) - - - -	gr. 2⅛
Trimethyldioxypurin (caffeine) - - -	gr. ⅜
Amylum - - - - - - - -	gr. ¾

Phenyl-dimethyl-isopropylpyrazolon is a new antipyrin derivative investigated in the La Roche Research Laboratories, and when combined with phenacetin (which is an analgesic of different chemical constitution and with different pharmacological properties) the resultant mixture is a compound in which the analgesic and other properties of the two ingredients are apparently mutually reinforced. The manufacturers state that saridone is a quickly-acting analgesic with no harmful side actions, its effect persisting for several hours and then slowly diminishing. The preparation is worthy of a thorough clinical trial in neuritis, neuralgia, dysmenorrhœa, rheumatism, fibrositis, and allied conditions.

ENDRINE

Endrine is a preparation issued by Petrolagar Laboratories, Ltd. (Braydon Road, London, N.16) and contains ephedrine 0·75 per cent., with camphor, menthol and eucalyptol, in an oily base. The value of ephedrine, the alkaloid extracted from the Chinese medicinal plant Ma huang, is now well recognized, its action as a vaso-constrictor being comparable with adrenaline, but it is more prolonged and gentle in its action and is without any reflex shock. The preparation is one well calculated to be of value in the treatment of acute coryza, nasal catarrh, sinusitis, asthma and hay fever, and it can be applied either with a dropper or by means of an oil atomizer.

GLYCINE

Widespread interest has been aroused recently with reference to the treatment of muscular dystrophy by the oral administration of aminoacetic acid. According to clinical reports, when cases of muscular dystrophy have been treated with 15 grams of aminoacetic acid once or twice daily there has followed immediately an improvement in the general condition of the patient, made manifest in a disappearance of fatigue and in motor power improvement; indeed, in some cases patients have been able, after a few weeks' treatment, to resume their normal activities denied to them for some years. The British Drug Houses, Ltd. (Graham Street, City Road, London, N.1) have been making aminoacetic acid for some time past for chemical use, but in a degree of purity which renders it ideal for medicinal purposes. It is therefore put on the market, under the name of Glycine B.D.H., for use in the treatment of muscular dystrophy. The manufacturers will be pleased to send a trial sample with further particulars to any practitioner who is interested.

KLEINERT THIGH SHIELDS

Kleinert thigh shields have been designed by a medical practitioner, manufactured by Messrs. Kleinert, and marketed through all chemists' shops. They are made of thin soft pink velvet rubber, and are designed to prevent chafing of the tender skin of women's thighs from the friction of sanitary towels as well as from urogenital discharges or from excessive perspiration. The shields are fitted quite independently to each thigh and do not interfere with any normal body movement or function or normal evacuations. This little invention appears to us to be eminently practical; the shields are obviously quite easily fitted and simple to wear, and they should prove a boon to many women.

CADBURY'S PREPARATIONS

Messrs. Cadbury have sent us a large sample of their chocolates and other preparations, prominent among which is the food-drink Bourn-vita, which has achieved great popularity with the medical profession, as well as with the general public, as a pleasant and easily digested nightcap. The half-pound drums of Cadbury's chocolate biscuits are becoming increasingly popular, for these handy containers keep their contents crisp and fresh. For the Christmas season a number of famous artists have designed boxes for Cadbury's chocolates, and the term "chocolate-box" must no longer be used in sneering at unsophisticated art, for the artists who have contributed designs include Laura Knight, Dod Procter, Mark Gertler, C. R. W. Nevinson, and George Sheringham.

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